American Aviation

DECEMBER 5, 1955

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Capital Airlines

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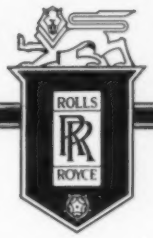
POWERED BY  ROLLS-ROYCE

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New York City: Administration Building, LaGuardia Airport Station 71, New York, N. Y. Stephen R. Kent, director of advertising; Menard Doswell III, regional advertising manager; Joan G. Payne, sales promotion manager; M. Michael Cerick, regional advertising manager. Phone: Illinois 7-4100.

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ABC BPA NBP ABP

Contents

DEC. 5, 1955 - VOL. 19, NO. 14

IN THIS ISSUE

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INDUSTRY ROUNDUP

Collapse of 'Geneva Spirit' Makes More Defense Spending Inevitable 23
Big Shakeup in CAA Reported Near 25
Airframe Makers Must Broaden Electronics Activities, Says Alison 26

ENGINEERING

Fairchild Takes Wraps Off STOL Design 28
Huge Tullahoma Test Center Taking Shape 32

PRODUCTION

Aerojet-General Steps Up Production Of 1500 KS Rocket Engine 37

ELECTRONICS

CANARI: Systems Concept for Airline Equipment 39

BUSINESS FLYING

Safety Aviation's Biggest Job, Lee Tells NATA Convention 70

TRANSPORT AVIATION

CAB Whitewash of Non-Skeds Imperils Airline Structure 8
Inefficiency Plagues European Airlines 8
Airlines to Get 104-mph 'Copter Next Year 8
Congressional Pressures Menace Independent Agencies, Says Ridley 9

DEPARTMENTS

Industry News Digest 5
Personal View 11
Letters 12
Production Spotlight 17
Airtrends 18
Pulse of the Industry 51
New Products 53
Maintenance Bulletin Board 69
People 70
West Coast Talk 71
International Aviation 72
Transport Trends 73
En Route 90

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from
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to
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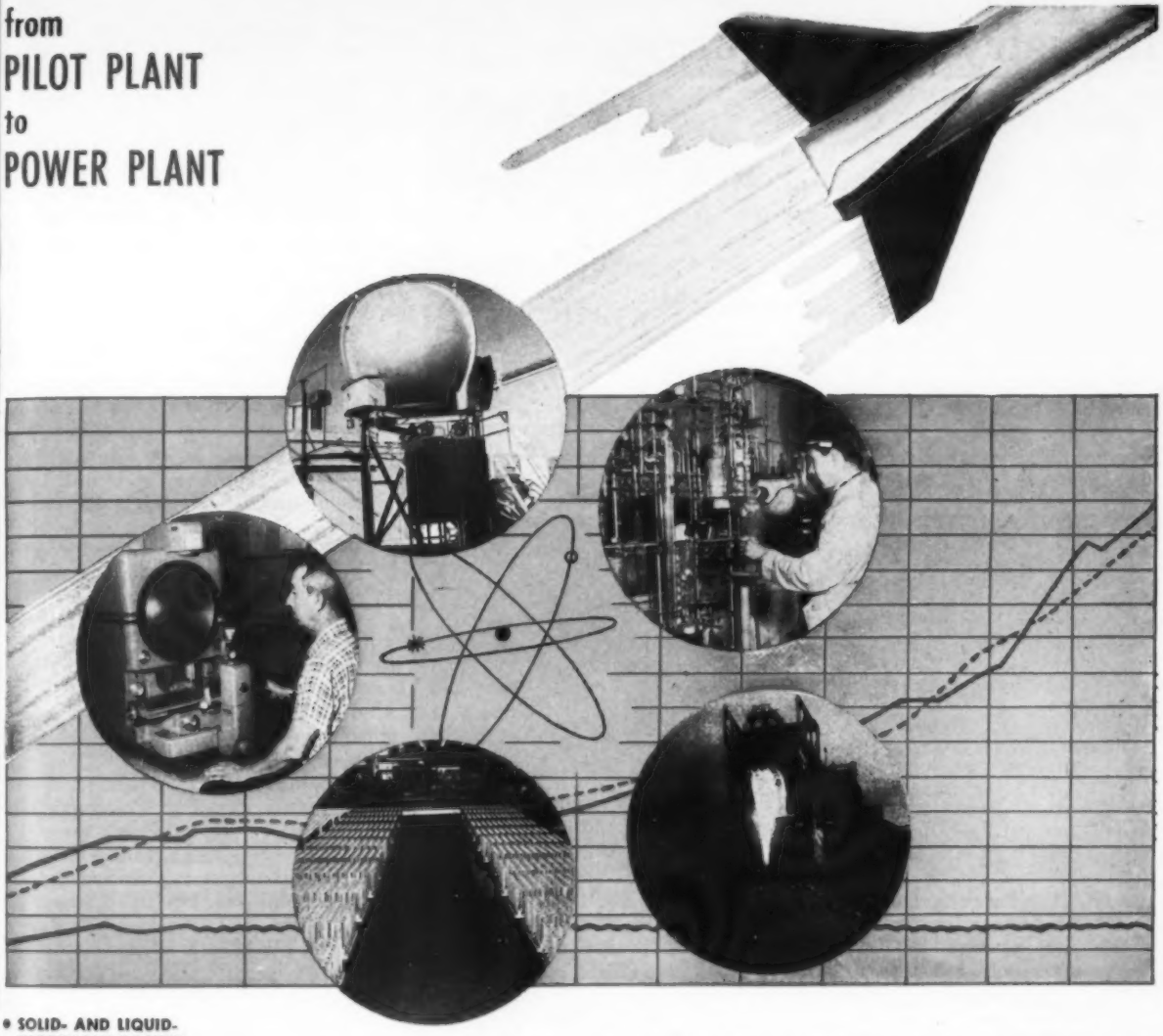

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Industry News Digest

Braniff, Delta Win Entry into N.Y.; CAB Extends Other Airline Routes

Braniff Airways and Delta Air Lines gained first-time entry into the New York market late last month as CAB issued its decision in the Southwest-Northeast Service Case, the third of this year's "big three" route cases.

Other carriers rewarded with new route grants of a major nature were Capital, American and TWA, with comparatively minor awards going to Eastern and Ozark. Here's how each carrier fared:

• **Braniff,** by a 3-2 vote with Members Gurney and Denny dissenting, was extended from Dallas/Fort Worth to New York via Oklahoma City, Tulsa, Memphis, Nashville, Chattanooga, and Washington. Service between New York and Washington is restricted to flights to and from the south but nonstop services between the northeast cities and Dallas/Fort Worth are permitted, making Braniff a new direct competitor of American in that market.

• **Delta,** by a 5-0 vote, extended from Atlanta to New York via Charlotte, Washington, Baltimore and Philadelphia, plus a new connecting link between New Orleans and Houston. Non-stop service between latter two points and major northeast cities authorized, but Dallas-New York flights must make stop at Atlanta. Delta thus becomes direct competitor for EAL in New Orleans-New York, Houston-New York, and Atlanta-New York markets, but a secondary competitor to AA and Braniff between Dallas and New York.

• **American,** by 4-1 vote with Member Lee dissenting, granted first-time rights to Houston and Pittsburgh. AA service to Houston must be on flights also serving Pittsburgh. Restriction on Pittsburgh service prohibiting nonstops to and from New England area.

• **Capital,** by a 3-2 vote with Members Gurney and Denny dissenting, granted extension of Route 51 from Washington to New York via Baltimore and Philadelphia; Routes 51 and 55 amended to permit new direct service between New Orleans, Atlanta, and Washington-New York area. Capital thus becomes direct competitor with Eastern and Delta in that market, although its Washington-New York service is subject to the same long-haul restriction attached to Braniff's new certificate.

• **TWA,** by a 5-0 vote, granted authority to serve Tulsa and Oklahoma City to its Route 2; also, granted first-time rights between Washington, Baltimore, Philadelphia, and New York, subject to same long-haul restriction as Braniff and Capital.

• **Eastern,** which had been in a front-running spot for a Dallas-New York route, was turned down on that application but was granted rights for new service between Pittsburgh, on the one hand, and Atlanta, Mobile, Birmingham and New Orleans.

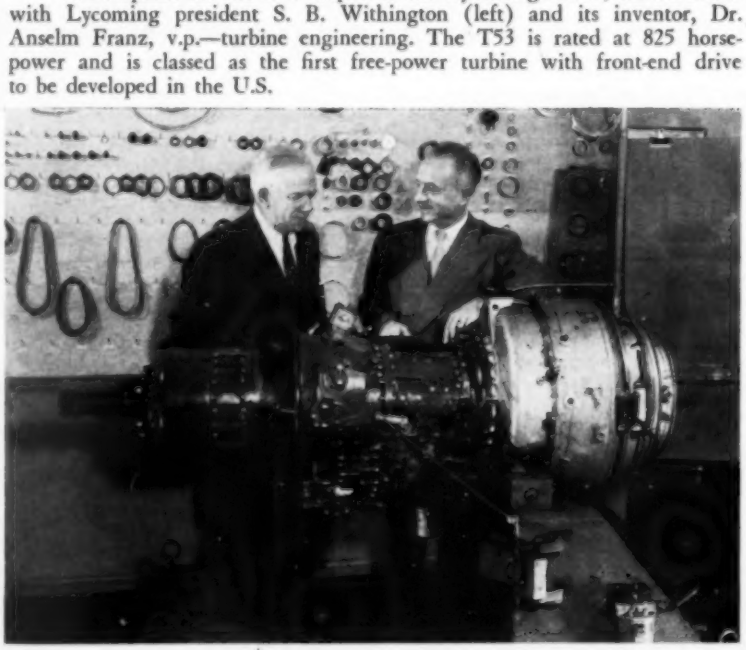
• **Ozark,** only local service carrier in the case, was authorized to serve Paducah, Ky. for a 3-year period.

The new certificates will become effective January 20, 1956.

Bell Unveils XH-40 'Copter Mockup

A full-scale, detailed model of the Army's XH-40 turbine-powered utility helicopter (above) was unveiled last week by Bell Aircraft Corp. to a military mockup inspection board. The XH-40 is rated to carry an 800-pound cargo load at speeds exceeding 100 knots. Photos released by Bell show comfortable seating for a crew of two and four passengers.

Powerplant for the new 'copter is the Lycoming XT53, shown below with Lycoming president S. B. Withington (left) and its inventor, Dr. Anselm Franz, v.p.—turbine engineering. The T53 is rated at 825 horsepower and is classed as the first free-power turbine with front-end drive to be developed in the U.S.



Boeing Gives Details On Long-Range 707

Boeing Airplane Co. has come forward with a new competitor for the Douglas DC-8 in the jet transport sales battle—a bigger, longer-range 707 powered by the Pratt & Whitney JT3 engine.

Alternative versions of the "Intercontinental Stratoliner," as Boeing calls

it, provide for 4,700 miles range with 119 passengers or 5,300 miles with 88 persons, both with fuel reserves for 975 miles' flying.

Principal changes in the "stretched" 707 are the addition of 100 in. to fuselage length (134 ft. 6 in. on standard version); increase in fuselage diameter to 148 in.; and provision of 500 sq. ft. more wing area, enabling fuel capacity to be extended beyond 20,000 gallons.

Payload of the long-range Boeing jet will be up to 15,000 pounds over the J57-powered version ordered by American Airlines and Pan American World Airways.

SABENA Orders Eight S-58 Helicopters

Sabena Belgian World Airlines' board of directors has authorized the purchase of eight Sikorsky S-58 helicopters for delivery starting next spring. Another airline to order the new Sikorsky model is Okanagan Helicopters, which has purchased one as the first stage of a new expansion program. Okanagan is the second North American carrier to order the S-58. The first was New York Airways (see story on page 84).

Riddle, AAXICO Get All-Cargo Certificates

New domestic all-cargo certificates have been awarded by CAB to Riddle Airlines and American Air Export & Import Co. (AAXICO), replacing, in effect, the original cargo license granted to the bankrupt U.S. Airlines, Inc. organization.

Certificates are for five years and, in the case of Riddle, supplements an existing certificate for service between the U.S. and Puerto Rico. AAXICO has held a large irregular air carrier letter of registration but has concentrated on all-freight operations. U.S. Airlines, an early applicant for renewal in the case, did not participate in the later stages, and was denied a new license.

Riddle's new routes extend from Miami to northern terminals of Boston, Detroit and Chicago. AAXICO's stem from New Orleans to the same terminals in the north.

In addition to cargo rights, both lines are granted authority to carry air express. Their request for mail rights was deferred for consideration in the case, currently in progress, involving renewal bids of Slick and Flying Tigers.

Chairman Rizley and Members Denny and Lee concurred in all phases of the decision. Vice Chairman Adams concurred generally but felt Riddle should have been granted a permanent license. Member Gurney, in India on bilateral talks, did not take part.

Piper's All-Metal Comanche

Piper Aircraft has announced development of its first all-metal, high-performance single-engine aircraft, with flight tests to begin early in 1956. It is scheduled to go on the market in 1957. Tagged the Piper Comanche, it will have retractable tricycle landing gear, carry four passengers. Production tooling is underway. The PA-24 Comanche will supplement the existing Piper line, which includes the twin-engine Apache, Tri-Pacer and Super Cub. It will be in the medium-price field.

Fokker Friendship Makes First Flight

The twin-turboprop-powered Fokker F-27 Friendship transport, now eyed by U.S. feeder airlines as the most promising "DC-3 replacement," made its first flight on November 24. The F-27 was flown by Fokker test pilot Hugo Burgerhout for 34 minutes in what company officials termed a "very successful" test hop.

Fokker plan is to bring the turboprop to the U.S. for demonstration following additional flight tests in Amsterdam. License rights on U.S. production of the F-27 are held by Fairchild Engine & Airplane Corp. and final decision on its manufacture here is not expected until after the U.S. visit.

Delta Orders Five 440s For Delivery in '56

Delta Air Lines last week placed a $3,475,000 order for five Convair 440 Metropolitans for delivery beginning in August 1956.

The new order brings DAL's total fleet of twin-engine Convairs to 25 and raises the number of 440 sales by Convair to 58. Production of the new Convair is now assured through 1956.

In addition to the Convairs, Delta has ordered eleven DC-7s.

Altschul Lectures

Selig Altschul, independent aviation consultant and contributing financial editor of AMERICAN AVIATION, this month is presenting aviation lectures to the New York Institute of Finance (affiliated with the New York Stock Exchange) for the seventh consecutive year. He discussed the aircraft industry Dec. 1 and will lecture on the airlines Dec. 8.

Priester, PAA Engineer, Dies in Paris at 64

Andre A. Priester, vice-president-engineering, Pan American World Airways, died of a heart attack in Paris November 28. He had been with the company for 28 years. At the time of his death, Priester was presiding at a meeting of the technical committee of the International Air Transport Association.

Parrish Visits Soviet Union

The first of a series of articles by Wayne W. Parrish, editor and publisher, on aviation and traveling behind the Iron Curtain will appear in AMERICAN AVIATION, starting in January, 1956.

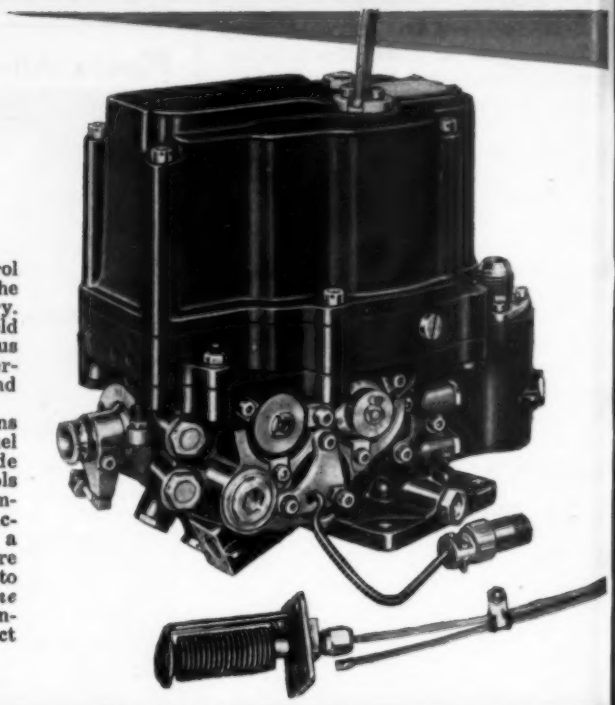
Mr. Parrish is currently on a tour of the Soviet Union, Romania, Hungary and Poland. His itinerary provides for flying on Aeroflot, the Soviet airline, in addition to airlines of several of the satellite countries.

He is the first aviation writer or business paper publisher to visit Russia since World War II.

THE COMPLETE, UNITIZED SYSTEM

Proved by past performance, CECO Fuel Control Systems have helped make possible many of the barrier-shattering achievements in aviation history. CECO design — maintained in advance of the field by an endless program of intensive research — plus CECO precision manufacture will make Chandler-Evans *always* the logical source for the latest and the finest.

Remember, *only* Chandler-Evans produces complete, unitized fuel control systems which include multi-element pumps, main controls and manual controls, with all components engineered and manufactured to function together as a perfectly integrated team. Here *today* to provide the equipment to meet tomorrow's needs is *one* source, *one* responsibility, *one* unbeatably high standard of product quality and performance.



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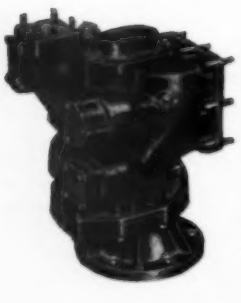

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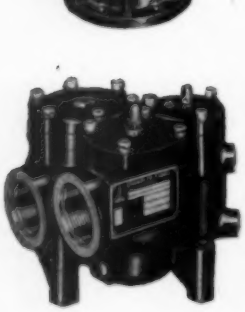
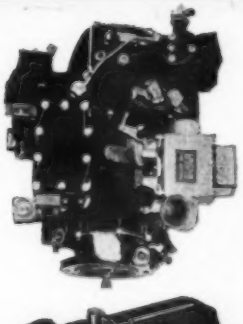
Pump fuel at pressures up to 1500 psi. Provide efficient operation at ambient temperatures from −65°F to +650°F. Produced in both single and multi-element units with integral boost... available with pressure regulating valves. Super-precision manufacturing techniques give high volumetric efficiency over a wide range of discharge pressures.



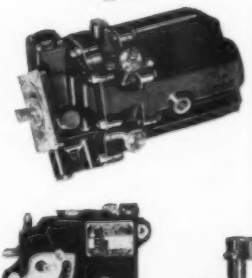
AFTERBURNER FUEL CONTROLS

The first afterburner fuel controls in the aviation industry were developed and produced by Chandler-Evans. The basic CECO Afterburner Control is a by-pass type regulator operating on a constant metering head across a variable orifice. Size of the orifice is regulated by the airflow parameter. Throttle modulation is available by providing for manual variations in either metering head or orifice size.



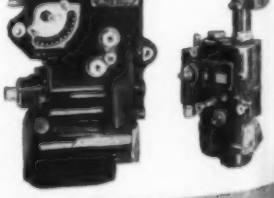
MAIN FUEL CONTROLS

Provide automatic metering of fuel for all conditions of rpm, altitude and airplane speed. Manually selected engine thrust is automatically controlled so that the desired thrust is attained in the shortest possible time consistent with conditions for proper engine operation.



EMERGENCY FUEL CONTROLS

Cut in manually or automatically, this element takes over the essential functions of the main fuel control in the event of battle damage or other emergency. Like many main fuel controls, this is a pressure regulating by-pass system.



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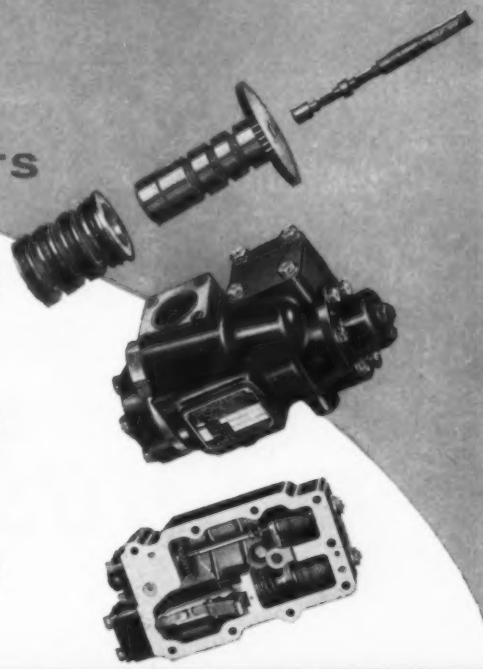
PRECISION COMPONENTS



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High precision essential to modern performance standards. Tolerances between critical mating parts are often held to .00008".

CONTROL VALVES

Piston-type variable by-pass valves operated by pressure differential. For such applications as location between fuel filter and main fuel pump to provide a scheduled fuel pressure to the engine.

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Variations in speeds, temperatures, pressures, altitude and other factors are automatically sensed and translated into mechanical motion to either engine or aircraft controls.

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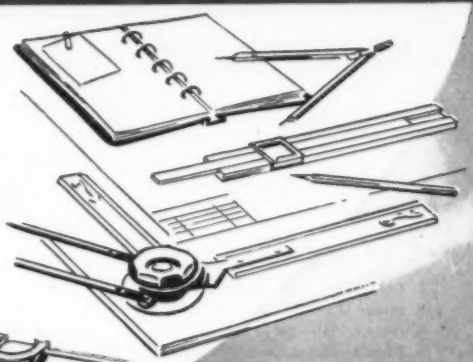
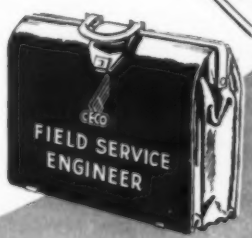
FOR TOMORROW'S PROGRESS



the CECO Service Story

FROM DRAWING BOARD TO FLIGHT LINE

Complete CECO Service starts at the drawing board stage with CECO Development Engineers working in the closest possible cooperation with aircraft engine designers to develop and produce CECO Fuel Control Systems integrated into the engine design requirements. Accepting a continuing responsibility to maintain CECO-equipped aircraft always at optimum performance levels, CECO follows through in the field . . . sending CECO Service Engineers onto the flight lines to incorporate all improvements and new developments.



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Charter Oak Boulevard, West Hartford, Connecticut

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thrustmeters

to indicate PRESSURE RATIO...to indicate DIFFERENTIAL PRESSURE

Actual photograph

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For over a quarter century, Kollsman has been making precision pressure sensitive mechanisms using displacement type diaphragms. This diaphragm can be called the heart of a thrustmeter pressure indicating system.

Our long experience making displacement type diaphragms guarantees reliable thrustmeters.

Proven Kollsman displacement type diaphragms, when fitted with Kollsman Synchrotels, comprise the transmitters for remote indicating types. Thousands of Synchrotels are now in use in other applications equally demanding of accuracy and durability.

Tailor-made Thrustmeters can be supplied for any engine-airplane combination. Write for complete technical information.

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1. Accuracy: .015 in 100% of readings at room temperature.
   .025 in 85% of readings at −55°C and +70°C.
   .035 in 15% of readings at −55°C and +70°C.
2. Altitude: No specific limitation.
3. Power: 115V, 400CPS, single phase, 18VA
4. Pressure Ratio Range: 1.2 to 3.4
5. Pressure Ranges (operating):
   Pt_2=2 to 50" Hg. Abs.
   Pt_7=2.4 to 100" Hg. Abs.
   Pt_7-Pt_2=0.4 to 70" Hg.
6. Temperature Range: −55°C to +120°C
7. Weights:
   Transmitter: 2.2 lbs.
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Personal View

By WAYNE W. PARRISH

Reckless . . . and Irresponsible

THE Civil Aeronautics Board relinquished its role as a responsible common carrier regulatory agency with its sweeping decision expanding greatly the operating authorities of the large irregular carriers who have been known up until now as nonskeds.

It was reckless and irresponsible action revealing superficial thinking and a vacuum of economic understanding. Not only was it a below-the-belt blow at the very common carrier industry it is supposed to be aiding, protecting and regulating in the public interest, but it was a far-reaching decision destined to haunt the government in years to come.

Two of the five members delivered powerful dissents. The incredible feature of an incredible performance was the vote of Chairman Ross Rizley who joined the two Democrats, Joe Adams and Josh Lee, to form a majority. The chairman's action is a strange prelude to the federal judgeship for which he has been aiming desperately.

It had been fully expected that the Board would take affirmative action to clarify the muddled status of the nonskeds. It was expected that the Board would encourage more charter operations. There have been some honestly-operated nonskeds who deserved as great a place in common carrier operation as could sensibly and reasonably be justified.

But the Board's 3-2 decision was a mockery, a sham and a bitter dose administered by unthinking public servants. It was bitter for two outstanding reasons. One is the authority to 49 nonskeds to advertise, sell and operate regularly scheduled services in any and all markets in the nation carrying individually-ticketed passengers. The fact that the Board restricts each nonsked to 10 trips between any two pairs of cities per month is irrelevant to the sweeping authority to enter the field of scheduled air transport unhampered and unhindered by the responsibilities imposed on the certificated carriers.

The second bitter dose was the blatant whitewashing of the nonskeds. For every law-abiding nonsked there has been another that has flagrantly violated all the rules of the book. The files of the Board have bulged with violation reports and evidence, including complaints galore about leaving paid customers stranded. Yet the Board has the utter gall to avoid even the slightest mention of violations. Instead it gushes paeans of praise for all nonskeds. Even a ten-year-old schoolboy would choke in disbelief.

The decision goes to great lengths to set up proper regulatory and enforcement measures to keep the nonskeds in line, but only the most naive person could believe that the new program is enforceable. And when the Board maintains that the new policy won't harm the certificated carriers, it is straining credulity to the breaking point.

The irony is that the new program isn't needed, at least as far as the public is concerned. Has the Board any conception whatever of the vast expansion of scheduled available seats taking place month after month? Has it the slightest idea of the strains ahead for the certificated carriers with the jet age coming up several years hence and with far more competition coming within the industry as a result of the generous dispensing of new routes this year? Apparently not.

Another irony is the long, costly and tedious enforcement case against North American Airlines, a case which was beginning to reach the final stage. In one fell swoop the Board has all but knocked into a cocked hat its own enforcement proceeding by its lavish praise of all nonskeds.

We have been generally favorable to Mr. Rizley. He took over a rough job at a tough time. He has made quite a number of commendable moves. But in the large irregular case this aspirant to a federal judgeship was led by the nose, blindly and supinely, down the most unjudgelike trail in the history of the CAB. It was a very disappointing forfeiture of responsibility and judgment.

Messrs. Adams and Lee have shown little mature thinking since they've been on the Board. Their mistakes pass almost unnoticed amidst the constant growth curve of scheduled air transport during recent years. But the groundwork they have been laying is not always in the best interests of the public, the stockholders of certificated carriers, or of common carrier regulation. How they were able to lead Mr. Rizley around by the nose, tweaking it triumphantly at the same time, is one of those strange inside stories which may never be learned in full.

The irregular decision will lead to confusion, headaches and needless trouble. We respect Messrs. Gurney and Denny for their dissent. At least they took a measure of their own responsibilities as public servants regardless of threats, pressures and happy-go-lucky expediency.

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Letters

Engineering Issue

Frankly, the fourth annual Engineering and Development Issue was by all odds the most interesting issue of AMERICAN AVIATION that I have ever read. I was particularly interested in the special issue features such as, "U.S. Turning to Unmanned Weapons" and "Electronics Substitute for Human Senses." The discussion on guided missiles was the best unclassified summary of this important field that I have ever seen. It was extremely well done and seemed to be a very realistic appraisal of the progress that has been made.

The engineering progress symposium was of particular interest to me since I am personally acquainted with a number of the people who made comments. Also, the discussions highlighted problem areas as viewed by responsible people in the industry.

Since all of these comments seem to be complimentary, I would like to point out that normally I am very critical of trade magazines such as AMERICAN AVIATION. There is such a tremendous number of technical and business magazines and books to read, one simply does not have time to read an issue from cover to cover. In this particular case, I did read the entire issue, which is an indication to me that the material was not only of interest but exceptionally well presented. I would like to offer my congratulations on this outstanding issue of your magazine.

CLYDE A. PARTON
Director of Aero Engineering
Minneapolis-Honeywell Regulator Co.
Minneapolis, Minn.

I want to tell you that I think it is a very well done job and makes fine reading. The remarks from the industry engineering people give a very interesting cross section and I am sure that those of us who regularly read your publication will always find an issue of this nature to be of value.

LOU FAHNESTOCK
Director-Engineering Dept.
Fairchild Aircraft
Hagerstown, Md.

We feel that the editorial on "Low-Speed Flight Research" is appropriate since after all the low-speed regime still largely designs the high-speed airplane. I feel that this issue is a definite and important step in progress and all of us will keep the issue handy for reference throughout the year. To my mind that is the ultimate of such initiative.

TOM SALTER
Vice President-Engineering
Cessna Aircraft Co.
Wichita, Kans.

I have reviewed your fourth annual Engineering and Development Issue with a great deal of interest and have been impressed with the thorough across-the-board coverage which you have presented. A yearly summary of this type is of great benefit to those Air Force officers assigned to our Division who, by virtue of their assignment, are somewhat separated from a close contact with their service research and development progress reports. I believe your summary is providing a very complete source book coverage to all persons who are interested in keeping abreast of all progress in this air age.

CAREY L. O'BRYAN, JR.
Colonel, USAF
Special Assistant to the Director of Military Application
Atomic Energy Commission
Washington, D.C.

Its comprehensive coverage should be of value to all with an interest in aviation.

M. H. PORTZ
Magazine and Book Branch
Department of Defense
Office of Public Information
Washington, D.C.

My opinion of the issue is that it is excellent. . . . I believe that the electronics function in both the airplane and guided missile national effort should be given a little more space. After all, it is the electronics equipment in the guided missile, and to a large extent in the piloted airplane, which is the brains that makes the thing go. I appreciate that much of this phase of the effort in these fields is classified and not too much is understood by the people outside the electronics industry but I believe a wider recognition of the efforts of the electronics industry in the airplane and guided missiles business would have a very salutary effect.

J. B. MOSS
President
Hoffman Laboratories, Inc.
Los Angeles, Calif.

We believe that this annual survey of development and engineering in the aircraft industry serves a valuable purpose in that it collects in one publication current thinking and a status report on our research, engineering and development activities.

The symposium section certainly provides a unique opportunity for presenting divergent views on the problems facing our scientists and engineers and for focusing attention on those areas in which the industry's scientific effort can be concentrated to provide solutions to pressing problems.

You and your staff are to be congratulated on this issue.

BURTON E. ENGLISH
Assistant Director
Public Relations
Aircraft Industries Association
Washington, D.C.

The Luggage Problem

To the Editor:

I have read with interest your comments on traveling in Europe and with some feeling those parts of your story dealing with the effect of air travel on luggage. Much more important than the abuse of the luggage and its consequent short life is the fact that it takes an appreciable length of time to get your luggage after landing from a plane trip. Hence I suggest that we have some luggage manufacturer produce what might be termed "gettable" luggage. Even if the luggage didn't last long, the privilege of being able to get it at the end of an air trip would be of considerable value.

Recently I noted that it took eight

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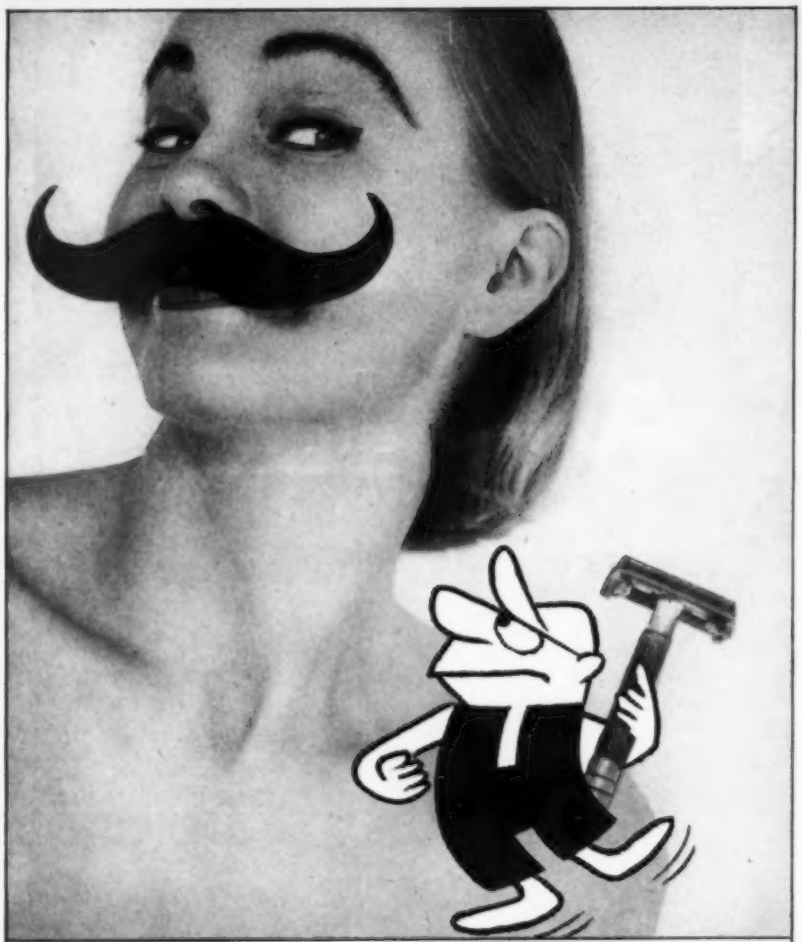

Hy Trol deals with The Unexpected

"La dona e mobile," or, as a later composer puts it, "A woman's a two-face." Never know what they'll do next. And, says Hy Trol, airplanes can be the same way.

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Letters

men a total of 22 minutes to unload the baggage from a standard air transport upon landing at a terminal with, I guess not more than a 70 per cent passenger load. I consider this to be a grave reflection upon the specifications of airline operators and the ingenuity of designers and manufacturers.

I am hopeful that the new designs of future transports which are being pictured today will include a space *in the passenger cabin* where luggage may be checked in and checked out. This would allow passengers to board planes with their baggage in their hands and to debark with it likewise in their hands. The checking in and out of the baggage could be done right at the door of the aircraft. Certainly the safe and secure storage of the baggage in the passenger compartment cannot be an insurmountable problem. Such a scheme would contribute to saving many precious minutes. Saving minutes is Air Transport's stock in trade.

CLEMENTS McMULLEN
Major General, USAF, ret.

515 Lamont Avenue
San Antonio 9, Texas

Lecture Material . . .

To the Editor:

My compliments on your editorial "Tomorrow May Be Too Late"—in the current issue of AMERICAN AVIATION.

It is an excellent and accurate analysis of the "sudden storm" problems of the Jet Age. I am using it for lecture material!

I hope that the problems you mention—financing, ground and navigation facilities, management training and the re-making of trade and travel routes—are not too soon for the public acceptance that will be necessary to meeting and solving them.

Only one generation has grown up with air transport—in its 28 years from the Boeing 40-As to the Boeing 707s. I suspect that of the small per cent (less than 10) of our population who fly today, the great majority are of that generation. They have accepted it and adjusted to it—as a part of their growing-up process.

This group will probably go along with the new speeds and accept it as a fact that it is more important to go coast-to-coast in four hours instead of eight.

But is this group large enough and persuasive enough to influence the public opinion which will be necessary to support the changes which these problems will require? More public funds for airport, navigation, communications and traffic control facilities; the use of insurance funds for financing this relatively new and partially accepted segment of our business economy; perhaps continued and increased subsidy by public funds until those extra seats are filled with new butts; the training period which will be required for management and operations personnel to cope with the new equipment and methods—and their significance.

I am personally confident that it can be done—through education. . . .

PHILIP S. HOPKINS

Department of Aviation
Norwich University
Northfield, Vermont

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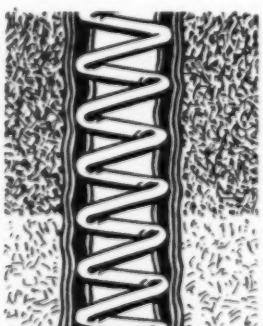
CAA-approved installations of Winslow Oil Filters are now in service on Southwest Airways' DC-3s, one more significant acceptance of Winslow full-flow filtration on transport aircraft engines. These filters are also in service on the Douglas DC-4, Boeing Stratocruiser, Lockheed Lodestar and other transport aircraft.

Airline records show that savings of $600 to $2500 per overhaul have been accomplished in actual service on various sizes of aircraft engines.



Elements in Winslow full-flow aircraft filters are the patented "Controlled Pressure" elements. They are designed to continuously self-adjust the pressure within the filter and allow for a full stream of filtered oil from the filter without opening by-pass valves. This is accomplished through the dual flow capacity, with two types of material. At this moment, there are no elements on the market that can replace Winslow units, and give this continually "Controlled Pressure" in a full-flow system.

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When & Where

Dec. 5-6—Industrial Plant Maintenance Institute, University of Wisconsin, Madison, Wis.

Dec. 5-6-7—Air Transport Association Agency Committee meeting, Woodner Hotel Washington, D. C.

Dec. 6-7—Professional Race Pilots' Association annual convention & business meeting, Carter Hotel, Cleveland.

Dec. 6-7-8—Air Transport Association, Passenger Tariff Committee, Adolphus Hotel, Dallas, Texas.

Dec. 7—Air Transport Association panel on turbine transport airworthiness regulations, IAS Western Headquarters Los Angeles.

Dec. 12-16—Nuclear Engineering & Science Congress, sponsored by Engineers Joint Council, Public Auditorium, Cleveland

Dec. 15-17—International Radio Scientific Union, U.S. National Committee fall meeting, Gainesville, Fla.

Dec. 17—Wright Brothers Lecture, U.S Chamber of Commerce Building Washington, D. C. (Wright Day Dinner, Sheraton Park Hotel,)

Jan. 9-10—National Symposium on Reliability and Quality Control in Electronics sponsored by Institute of Radio Engineers, Statler Hotel, Washington, D. C.

Jan. 9-13—Society of Automotive Engineers annual meeting, The Sheraton-Cadillac and Hotel Statler, Detroit.

Jan. 19-21—National Simulation Conference sponsored by Dallas-Fort Worth Chapter of Institute of Radio Engineers Group on Electronic Computers, Dallas, Texas.

Jan. 23-26—Plant Maintenance and Engineering Conference and Show, Convention Hall, Philadelphia, Pa.

Jan. 23-26—Institute of Aeronautical Sciences 24th annual meeting and Honors Night Dinner, Sheraton-Astor Hotel, New York.

Feb. 2-3—National Symposium on Microwave Techniques, sponsored by Institute of Radio Engineers' Antennas and Propagation Group, and Theory and Techniques Group, Philadelphia Pa.

Feb. 9-11—Eight Annual Southwestern IRE Conference and Electronics Show, Municipal Auditorium, Oklahoma City.

Mar. 19-21—Society of Automotive Engineers, National Production meeting and forum, Hotel Statler, Cleveland.

Mar. 19-22—Institute of Radio Engineers National Convention and Radio Engineering Show, Waldorf-Astoria Hotel and Kingsbridge Armory and Palace, New York.

April 9-12—Society of Automotive Engineers National aeronautic meeting, aeronautic production forum and aircraft engineering display, Hotel Statler New York.

May 1-3—Electronic Components Symposium, sponsored by IRE, ALEE, RETMA, WCEMA, NBS, Departments of Defense and Commerce, Department of Interior Auditorium, Washington, D. C.

Honor Roll

***E. P. (Bert) Lott,** United Air Lines Asst. to vp-flight operations, Denver, Colo. (30 yrs.)

Richard Hutton, Grumman Aircraft Engineering Corp. Chief engineer, Bethpage, N.Y.

Benjamin P. Gambee, Grumman Aircraft Engineering Corp. Inspection chief, Bethpage, N. Y.

William H. Galbraith, Grumman Aircraft Engineering Corp. Wing assembly, Bethpage, N.Y.

John Kerr, Pratt & Whitney Aircraft. Operating engineer, East Hartford, Conn.

Paul Bordieri, Pratt & Whitney Aircraft. Machinist, East Hartford, Conn.

Industry Spotlight

• Despite earlier indications to the contrary, Lockheed's project at Marietta to develop a jet tanker powered by Pratt & Whitney J75s also calls for evolution of the same plane as a high-speed cargo-transport. AF, which decided to promote Phase 1 studies of the Lockheed plane at the time it standardized on the Boeing KC-135, has already given Marietta a $500,000 R&D contract.

• Northrop is optimistic about a successor to the F-89D Scorpion even though it has already received the last Allison J35s for installation in the interceptor. Still upcoming is the F-89H, a Falcon missile-firing Scorpion. Also a strong possibility is a delta interceptor for which Northrop has a Phase 1 contract. On the last plane, however, Northrop is competing with Lockheed straight-wing and North American swept-wing Mach 2 interceptors.

• Lockheed's Marietta facility was the only one of the three B-47 sources to be stretched out when the AF decided to postpone acceptance of a number of Stratojets in an effort to reduce spending this year. Douglas-Tulsa and Boeing-Wichita will still phase out the plane in December 1956, Marietta in March 1957.

• Martin's B-57D, latest version of the Canberra light bomber but powered by two Pratt & Whitney J57s rather than Wright J65s, is now flying at Baltimore.

• Demand for titanium for airframe and engine use is climbing again. Titanium Metals Corp. is booking orders for mill products almost to capacity. And Rem-Cru Titanium reports fourth-quarter orders ahead of any comparable period.

• Mitsubishi Heavy Industries has been licensed to build the F-86 Sabre jet in Japan. The company has been overhauling aircraft of this type for over a year and is already building non-structural parts under license from North American.

• AF has installed one Aeroproducts propeller on a Lockheed C-130 and has ordered a complete set of Aeroproducts fans for another of the Allison T56-powered cargo plane. Curtiss Turbolectric props are supposed to be standard equipment for the Hercules but Aeroproducts is hopeful of getting part or all of the order.

• Martin's first-stage rocket to launch the artificial earth satellite will be a modified Viking. Aerojet-General Corp. is putting in a strong bid to get the order for the second stage of Project Vanguard.

• A small airborne weather radar is under development by National Aeronautical Corp. of Ambler, Pa. A thorough paper study is being made before it is committed to prototype. The unit would be for use in the small twin-engine business aircraft.

• Lycoming will soon make available constant speed propellers for its 150-hp engine. Modifications to present engines will be possible through marketing of a special kit.

• Studebaker-Packard Corp. stands to become the second major automotive firm to get a prime missile production contract through acquisition early this year of Aerophysics Development Corp. of Los Angeles. Model involved is the Army's Dart artillery missile that was developed at Aerophysics. Only other missile producer in the automotive field is Chrysler with the Redstone surface-to-surface missile originally developed by German V-2 scientists at Redstone Arsenal.

• Lockheed is planning to buy a small quantity of Rolls-Royce RB 109 turboprops and may also acquire some Napier Elands. The British turboprops would be fitted in the prototype for evaluation as potential powerplants for the Electra.

AEROTHERM

Photograph Courtesy Capital Airlines

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THERE MAY NOT BE MUCH FANFARE, but it's clear now that the Pentagon's dispersal policy is taking effect. This fact stands out in two recent developments.

Boeing Airplane Co., which had taken an option on a site in the Denver area for a new plant to build Bomarc interceptor missiles, has decided (with Air Force approval) that its Wichita facility can handle the work instead. Exact time the IM-99 will be put into production, however, still has not been set.

Martin, which is expected to get a contract for a second intercontinental ballistic missile to backstop the Convair SM-65 Atlas, has decided to build a 500,000 sq. ft. facility 15 miles south of Denver and expects it to be ready within 15 months. About 5,000 will be employed there within the next four years. AF sources indicate Martin's decision to build a Denver Division (with its own money) was made without seeking Pentagon approval.

ACCELERATION OF PRODUCTION of two new supersonic interceptors may not be as great as the Pentagon indicated to Congress last summer. Available reports say the McDonnell F-101B is being brought into production quickly, but this boost may be balanced by a stretchout of the F-101A escort fighter.

Moreover, Lockheed's F-104 program, on which the company had proposed greatly increased numbers and earlier delivery times, will not be speeded up as much as the Air Force had intimated to Congress after the Russians displayed jet intercontinental bombers at a Moscow air show in May.

Former AF Secretary Stuart Symington said he had received reports the speedup of the two fighters might not take place after all, suggested Air Force might be called before the Senate Armed Services Committee, of which he is a member, to explain why.

IT'S ALMOST CERTAIN that the 1952 memorandum of understanding between the Army and Air Force governing what types of planes the Army may buy will be revised.

Ever since it agreed to limit its purchases to fixed-wing aircraft under 5,000 pounds (there was no limitation on helicopter size) the Army has been unhappy. And many past efforts have been made by Army officials to "get off the hook" without success.

But activity is increasing again. Maj. Gen. Hamilton H. Howze, chief of the Army Aviation Division, is busy preparing recommendations for chief of staff Gen. Maxwell D. Taylor, and these presumably will call for greater use of aircraft by the Army.

Prospects of success? AF Secretary Donald A. Quarles indicates he is ready to reconsider the whole matter.

ARMY'S AVIATION DIVISION probably will be redesignated the Aviation Directorate and move up one step in the table of organization as a result of the latest Army command reshuffle. Until now, Aviation Division's Gen. Howze has been reporting to Maj. Gen. P. D. Hawkins, assistant chief of staff for G-3 (operations).

G-3 has been moved to the military operations, and Howze now will report to Lt. Gen. C. D. Eddleman, chief of that section.

Unchanged under the reorganization are the aircraft section in the Office of Chief of Transportation and the Office Chief of Research and Development.

The New American Tradition...

Be Prepared

Convair is now producing in quantity the supersonic, delta-wing F-102A. With this day-or-night, all-weather Interceptor the U.S.A.F. Air Defense Command will *be prepared* to better fulfill its mission – the discouraging of attack through the effective protection of America! Through **engineering to the Nth power** Convair continues to *be prepared* to help assure peace and freedom by producing aircraft with the capabilities of the F-102A.

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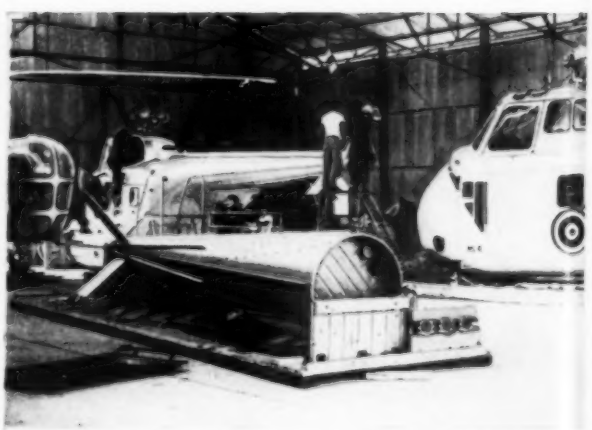
WASHINGTON, D. C.

FLIGHT TESTING THE ANTI-SUB HSS—At Patuxent River, Maryland, the Navy has subjected the HSS helicopter to carefully-instrumented, grueling tests. This submarine-hunter is one version of the high-performance Sikorsky S-58. It uses electronic sonar gear to locate and track subs. Addition of arming racks enables it to launch torpedoes or mines. The S-58 has twice the payload capacity of the S-55. Rotor blades fold back for shipboard use.

AROUND THE WORLD WITH SIKORSKY HELICOPTERS

FOR VENEZUELA—A new Sikorsky S-55 type helicopter, pictured above, has been delivered to the Venezuelan Air Force. With the delivery, Venezuela joined the ranks of 14 nations whose armed forces or commercial air operators rely upon the efficiency and dependability of versatile Sikorsky helicopters. Pilots were trained in the S-55 at Sikorsky's Bridgeport plant.



FOR THAILAND—A representative of United Aircraft Service Corporation supervises the assembly of Sikorsky S-55 type helicopters in Bangkok. The machines will be flown by the Royal Thailand Air Force, on low-level border patrol duty. Six of the big Sikorsky helicopters were ordered. The type has achieved an outstanding record operating in jungles and other remote areas.

HELP FROM THE SKY—When flash floods hit the northeastern states in late August, helicopters picked up nearly a thousand people and carried them to safety. People were rescued from houses being torn to pieces by savage flood waters, from hilltops, and from stranded trains and cars. In Connecticut alone, more than 500 were saved by Sikorsky helicopters. Above, a USAF Air Rescue Service Sikorsky H-19, pictured in Pennsylvania, lifts a woman to safety as a man waits his turn at a second floor window. Helicopters were often the only means of rushing food, medicine, and rescue workers to the stricken areas.

HELICOPTER HISTORY

FIRST HELICOPTER AIR-SEA RESCUE

In November, 1945—almost ten years before the recent flood disaster in which Sikorsky helicopters saved hundreds of people—a Sikorsky R-5 made what is believed to be the first helicopter rescue. Crewmen were brought safely ashore from a storm-swept barge wrecked on Penfield reef, off Fairfield, Connecticut.

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Collapse of 'Geneva Spirit' Makes More Defense Spending Inevitable

- **Air Force likely to boost 1957 budget request over $16.5-billion mark.**
- **Relations with Army strained over prospect latter's air funds may be cut.**

By ROBERT M. LOEBELSON

WITH THE 1957 budget figures due in the hands of the printer by Dec. 15, Budget Director Rowland D. Hughes and his aides last week were scanning all proposals, and especially those of the Defense Department and the Air Force, in the hope that they could find some padding. But there was little doubt that even after they were through, the Defense Department and the AF would be asking for more new money than the $31.9 billion and $14.7 billion they received, respectively, this fiscal year.

About a month or so ago, Pentagon reports had it that the Defense figure would be $34.5 billion and the USAF would be looking for about $16.5 billion, with the Army and Navy splitting the remainder. However, a USAF spokesman in a position to know told AMERICAN AVIATION, "We can't do the job assigned to us with sixteen-five."

And while Defense Secretary Wilson was talking about 1957 spending rather than new money, his prediction that increased labor and material costs would involve higher expenditures next year can also be interpreted to mean that additional funds will be sought after Congress convenes in January to take care of plane and other hard-goods purchases two and three years from now.

• **Although Wilson** and other Pentagon officials tended to play down the failure of the recent Big Four talks at Geneva by declaring the resumption of the cold war would have "little or no effect" on the nation's defense program, it is evident that Russian reluctance to negotiate at Geneva made a firming up of defense spending inevitable for the coming fiscal year.

Some results of the Geneva conference were immediately apparent (in the form of psychological warfare) and others are certain to be made evident soon.

• **At Fort Polk, La.,** where Operation Sagebrush is in progress, the AF showed off an "entirely new" method of jamming defense radar. (This was evidently designed to give the leaders of the Russian Air Defense Command heart trouble and also to tell the Soviets that the U.S., since it can discuss jamming techniques, has methods of overcoming them.)

• **In Washington,** the decision to go ahead with the award of a contract to The Glenn L. Martin Co. for an intercontinental ballistic missile to parallel the Convair Atlas probably has already been made. (AF planners had selected Martin's entry as the winner of a competition but have been holding up the contract award.)

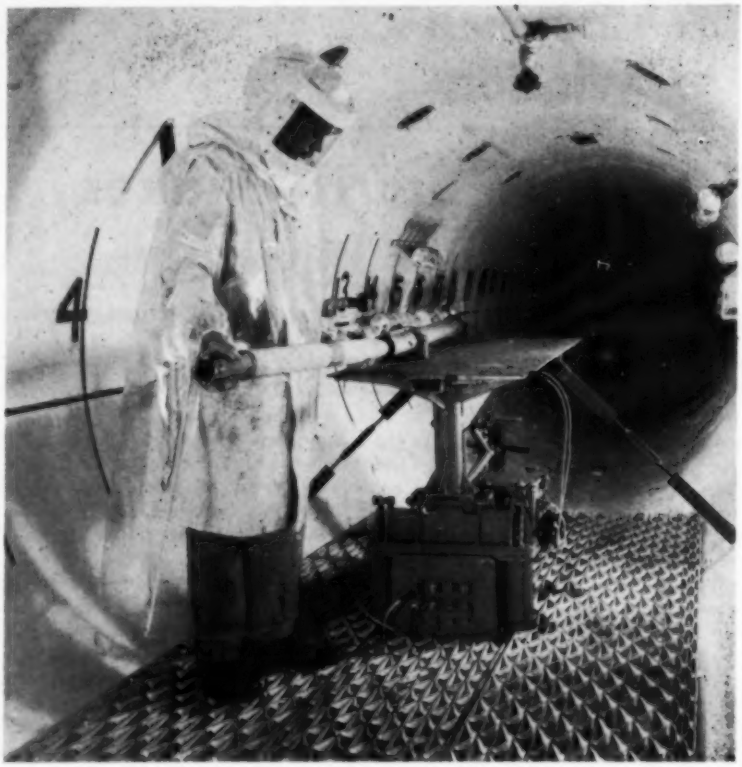
• **AF's budget** for research will undoubtedly include at least $100 million more than last year to take care of technological breakthroughs. (Assistant Air Secretary for Research and Development Trevor Gardner had sought this sum as a supplemental appropriation for fiscal 1956.)

• **Recommendation** to develop a medium-range (probably 1,500 miles) guided missile has been made by the Joint Chiefs of Staff. USAF, from all indications, will have primary responsibility for this weapon, but the Army may also be permitted some efforts along this line. (Medium-range missile has been under consideration for many months by the JCS but their recommendations were given to Wilson as soon as his plane from Geneva landed.)

• **Air Secretary Donald A. Quarles** chose a post-Geneva conference talk to report that the AF now has 127 combat-ready wings, that Boeing-Wichita will turn out its first second-source B-52 this month, and that there are now so many B-47s available that the AF can afford

While Army and Air Force debate its merits, the Nike surface-to-air missile is rolling off the Douglas Aircraft assembly line in increasing numbers.

Firing Rockets in Test Tunnel



Aircraft rockets designed and developed by the Rocketdyne Division of North American Aviation are test-fired in a steel tunnel at the company's Santa Susana (Calif.) Field Test Laboratory. Rocketdyne has developed several types of small liquid-propellant as well as solid-propellant rockets.

to stretch out the Stratojet program.

One by-product of Geneva's impact on the 1957 defense budget is bound to be a worsening of already strained relations between the Army and Air Force.

Any increase in money for the USAF will almost certainly be accompanied by some sort of decrease in Army funding. As recently as Nov. 17, Wilber M. Brucker, Army Secretary, repeated the now-standard Army line on aviation:

"The Army does not seek to create an Army Air Corps duplicating functions of the Air Force. The Army's need is for relatively slow, low-flying planes, geared to the environment of the infantryman—just the opposite of the fast, high-flying aircraft of the Air Force. There is no conflict in this area. Army aviation is as much an integral part of the ground forces as the artillery. It is an essential element of the battlefield mobility of our troops, and . . . must be under the full and immediate control, and subject to the direct command, of the commander responsible for ground operations."

Few in the Air Force would argue with Brucker's argument as far as "relatively slow, low-flying planes" are concerned. The Army-USAF "memorandum of understanding" giving the ground service the right to procure planes weighing up to 5,000 pounds and helicopters of any size makes Army officials unhappy but leaves USAF proponents content.

• **But it is in another area** that the two services violently disagree—the merits of the Western Electric-Douglas Nike surface-to-air missile. USAF claims (unofficially, of course) that the Nike with its maximum range of about 25 miles cannot provide an adequate defense against high-flying Soviet jet bombers and thus does not warrant the expenditure of hundreds of millions for permanent installations surrounding major U. S. cities.

AF officials also contend that these sums for acquisition of land, launching devices and the Nikes themselves could be put to better use elsewhere, possibly in accelerating the long-range Boeing Bomarc interceptor missile.

But Brucker has displayed no hesitancy in boosting Nike. In a sweeping statement, he declared it is "deadly accurate." Moreover, he added, Nike "can reach, outmaneuver and destroy any aircraft—regardless of speed—either available now or under development."

(Nike's range is 25 miles. The later Nike B will reach out 50 miles. Top speed of the present Nike is about 1,500 mph and the advanced version will probably reach 2,200 mph. USAF has several Mach 3 aircraft projected and so, presumably, do the Russians.)

• **The arguments** between the Army and AF over the merits of the Army missile reached a climax at the White Sands Proving Ground in New Mexico when Nike was pitted against the AF's Martin Matador TM-61 pilotless bomber.

AF officials report that Nike knocked one Matador out of the sky but missed on several other firings. Army officials contend, however, that the interceptor missile missed in four attempts in October but made two kills out of two tries early in November.

Also under dispute are the conditions under which the Nike-Matador tests were held. The Army is claiming the tests were made realistically while the AF holds the TM-61 was flying more slowly and lower than normal. Matador is in the 600-mph class, i.e., roughly the speed of a modern jet bomber like the B-47 or Russian Type 37 Bison.

• **With the evaporation** of the so-called "Spirit of Geneva" at the second conference in the Swiss city, therefore, it is evident that the U.S., as Quarles puts it, will have to continue "to maintain such striking power as to make aggression against us prohibitively discouraging" and to anticipate that the Russians will do the same.

Such a policy makes mandatory a high level of new defense money and expenditures not only for fiscal 1957 but for several years thereafter.

It was not too long ago that Pentagon officials were indicating a "long pull" defense program of about $34 billion a year, including $16 billion for the USAF. But rising costs of the materials that go to make up hard goods and the wage increases paid to the workers who produce them are already tending to make last spring's estimates obsolete.

• **Wilson** has just put out a trial balloon suggesting a relationship between the general prosperity of the nation and its appropriations for defense. Emphasizing that he was speaking only for himself, he suggested that as the gross national product goes up, the absolute amounts spent for defense, if held constant, would cause some decreases in the military program because costs are up.

On the other hand, he pointed out, "If we spend approximately the same percentage of the gross national product or of the taxes . . . then we should be able to maintain or even improve somewhat qualitatively our military program."

Thus, while not directly urging that the military get a fixed percentage of the gross national product ("I wouldn't like to give you an absolute yes or an absolute no to that"), the Defense Secretary was certainly promoting increases for defense as the country expands economically.

The U.S., therefore, finds itself unwillingly committed to a defense program involving annual sums ranging upward from $34 billion as long as the cold war continues.

For the aircraft industry's top executives, such a prospect is highly pleasing from a business point of view. It can be safely assumed that aircraft and missile producers will continue to get the bulk of this money. ◈◈◈

Big Shakeup in CAA Reported Near

By JOSEPH S. MURPHY

A major realignment of the Civil Aeronautics Administration's Washington organization, in the mill now for more than two years, is only a matter of weeks, perhaps a month away.

As one top Commerce official puts it, "it won't take place this week but it will come in a reasonably short time." Observers consider this to mean sometime before Congress reconvenes, as a delay beyond that time would obviously confuse the agency's position in Fiscal 1957 budget testimony before Congressional committees.

Although final recommendations for reshaping CAA have reportedly been on Undersecretary of Commerce for Transportation Louis B. Rothschild's desk for several weeks, that Commerce official declines comment on specific areas of CAA affected.

It's a matter of the most important areas getting first attention, Rothschild told this reporter. His statement, however general it may seem, does lend credence to continued reports that the reshuffle will affect four key areas of CAA's present administrative setup. These are:

• **Air Traffic Control** — Continued pressures from all quarters of aviation—but primarily from airlines and military services—for an answer to the traffic control problem makes elevating the ATC function in CAA almost a certainty.

• **Aircraft Engineering**—The sharp rise in CAA aircraft and engine certification activity brought on by the avalanche of U.S. and foreign jet and turboprop applications has peaked workload in this CAA division at an all-time high. Although a part of CAA's Office of Aviation Safety until now, prospects are that Commerce will upgrade engineering to the level of a program office much in the same manner that airlines have found it necessary to set up special design engineering groups separate from their routine maintenance and engineering activity.

• **Program Planning** — Although this office will probably not be abolished as initial reports indicated, more emphasis will be placed on handling of the planning function within the various offices of CAA responsible. This probably means that a basic distinction would be made between planning of future programs and planning of existing programs, and that individual offices would undertake all planning once a new program is authorized.

• **Staff Administration** — Last key area expected to feel the impact of the reorganization is the immediate staff office of CAA Administrator Fred B. Lee. A major change here has been considered a foregone conclusion since May, when Commerce announced the appointment of C. J. Lowen as deputy administrator, a post left vacant since Lee took over CAA reigns in May, 1953.

On the basis of Rothschild's policy of first things first, the long-neglected CAA's air traffic control activity stands out as the most likely to get the full treatment. General feeling in industry for several years now has been that ATC is the agency's most important role—but that CAA's experts on the subject were lost far down the organization ladder.

It wasn't until D. D. Thomas was named deputy director of the Office of Federal Airways that a top ATC man came even close to direct contact with CAA Administrator Lee. Even this move wasn't regarded as a final solution and prospects now are that the coming

Where Navahos Are Tested

Simulated flight loads are imposed on guided missile airframes in this tower at North American Aviation's Downey (Calif.) plant where the Missile Development Division is working on the Air Force SM-64 Navaho intercontinental surface-to-surface ramjet missile.

ROTHSCHILD

reorganization will result in a separate Office of Air Traffic Control.

Under this setup the present Office of Federal Airways will stay in existence but its jurisdiction will be confined to equipment design and maintenance. Decisions on the types of systems needed and how they will be operated will come from the new OATC.

Ironically, this change is reported to be the one most actively opposed by Administartor Lee and his top advisors. It is generally conceded that the military wants a stronger ATC office in CAA, industry wants one but strangely the one group opposing it is CAA itself.

• **Objections here,** coupled with a similar disagreement as to how to organize the program planning and administrative staff functions, have been considered major causes for a growing breach between the Administrator's office and top Commerce officials.

But unlike the subdued activity in CAA on air traffic control, the complaint in these other areas has been over-activity. Feeling has been that the planning office under Assistant Administrator J. D. Blatt has had too wide a reign over the day-to-day mapping of routine strategy throughout CAA's offices, and that these offices should have more say on how their operation will be run.

• **In the case** of staff administration, the "assistant administrator" organizational concept furthered by Lee since he decided to go it alone without a deputy back in 1953 is obviously one not shared by Undersecretary Rothschild. Core of the problem here (until the Lowen appointment this year) was that, in Lee's absence, CAA had three heads, an assistant administrator for arministration, another for operation and a third for planning.

Now, with Lowen filling the deputy post, it is generally agreed that the assistant administrator setup is sporting a surplus tag and is sure to go when the reorganization breaks. Best guess is that top administration will be handled by the administrator and deputy and that the former assistants will fall back as heads of the various program offices in which they formerly specialized.

The big question still to be answered is whether the staunch opposition raised by Lee and his advisors to reorganization in these areas will make him the logical head for the revamped CAA. Here opinions vary 180 degrees, but the prospect of a new CAA Administrator gains strength, the longer the announcement of the shakeup is delayed.

• **Reason** is that it is generally felt that the working relationship between Lee's office and Commerce has continued to deteriorate since the downhill slide which started with the reign of Robert B. Murray, Jr. as Undersecretary for Transportation. And the best guesses are that the only thing that will correct this trend is a clean sweep of the CAA's top office, leaving the only Rothschild appointee, Lowen, in the new setup.

The only factor that might militate against such action is that Lee's advisors, not Lee himself, have been the principle target of criticism on how CAA has been run. With the elimination of the assistant administrator posts, there still remains a strong possibility that CAA-Commerce relations might be restored to a cooperative level and that Lee might continue as Administrator.

LEE

Although current activity on reorganizing CAA has been confined to its Washington staff operation, this doesn't mean that the agency's regional setup will go unchanged. Known policy in Commerce is that the regional problem can't properly be tackled until the headquarter's revamping is first solved.

Again, this all boils down to Rothschild's policy of first things first, and it's a sure bet that once the Washington CAA reorganization becomes a reality, the individual "dynasties" that represent its four domestic regions are bound to come under some close scrutiny. ◈◈◈

Airframe Makers Must Broaden Electronic Activities, Says Alison

PALM SPRINGS, CALIF.—Airframe manufacturers will have to broaden rather than curtail their electronic capabilities, John R. Alison, vice president of Northrop Aircraft told the annual meeting of the Aviation Distributors and Manufacturers Association last month. He called for recognition of the fact that the weapons system concept has "changed the complexion of our industry," adding "that we cannot and should not turn back."

He said the "jurisdictional debate" between airframe and electronic manufacturers will "hurt ourselves as an industry, and reduce our combined ability to turn out the most advanced weapons of defense." Proper interpretation of the "significance for the future of packaged air power" is mandatory, he pointed out. It "will continue to make demands upon the aircraft industry that can only be met with an integrated engineering and production organization that will enable the industry to fulfill its responsibilities in weapons system development."

"I think we should accept as a fact of life that the airframe industry will have a permanent requirement for this broader base of technical skill and production capability to carry out effective weapon system development," Alison said. "The increasing emphasis upon electronics, however, particularly in the missile field will, at the same time, see the continued growth and expansion of the independent electronics industry. In no sense is this an unwarranted duplication of existing industry skills."

• **Alison acknowledged** that "at times" the airframe manufacturers will "be in competition" with these specialists, but "at the same time we are competing . . . we shall continue to need each other . . . These same technical capabilities that make it possible for us to work closely together also make it possible for us to compete with one another in certain areas. This is the way it will be and this is the way it must be. Let us not be surprised when it happens and let us not think that we have unresolved jurisdictional problems that our military customer has not solved for us."

Alison emphasized that airframe manufacturers will not replace electronics manufacturers engaged in more specialized development and production work. "We are an industry producing packaged airpower, and as an industry we must collectively gear our thinking to this concept," he concluded.

The accessory and component man-

ufacturers and their distributors also heard W. P. Thayer, vice president of Chance Vought Aircraft, label the 'survival barrier" of getting pilots out of high-speed aircraft as being far more critical than breaking the "thermal barrier." He said unequivocally that present escape equipment is "marginal at best," noting that "not only is the ejection seat concept inadequate, but the reliability of the seat is inadequate."

Reliability Key to Survival

Reliability "is the whole key to survival," Thayer declared. Pressure suits "may be a step in the right direction, but are too restrictive to the pilot," he observed. The cockpit capsule, he feels, "is many years away." He warned: "We have to improve what we have, providing interim equipment which must be positive, simple and reliable."

Thayer noted that a lot more could be done to get the plane back, which he observed was the best way to get the pilot back. He recommended that possibly specifications, written long before the plane is built, should be revised "realistically" and that manufacturers should look at the equipment "through the pilot's eyes." "You can give a combat pilot the finest plane in performance for his job, but if he doesn't trust it he won't use it to its full potential," he concluded.

• **Air freight** was the third major topic highlighted at the meeting. Robert Prescott of The Flying Tiger Line rated lower rates as the key to air freight's future.

"The big notch in the key," he explained, is the airplane itself. "The Douglas DC-6A and the Lockheed 1049H are the beginning, to allow for bigger volume—moved faster, which will lessen cost." He cited the following figures on equipment to bear out his point: The C-46 costs 24¢ per ton mile and requires 21 hours to cross the country; DC-4, 22¢ and 19 hours; DC-6, 14-15¢ and 11 hours. Estimates for the 1049H, now on order, are 12¢ per ton mile and 9 hours flying time.

He urged ADMA to concentrate on reducing weight of aircraft components and accessories, predicting vast increases in air freight potential with only a 20% reduction in plane weight.

Riddle Warns Members

• **The business session** of ADMA's 26th meeting, hailed as its most successful, heard outgoing president James Riddle caution the association against becoming a "closed country club." He reiterated predictions of increased air traffic and business aircraft use. It "must logically be assumed," he said, "that there will be an influx of new manufacturers with new products leading to the need for new distributors." ADMA would become a "crippled organization" if the newcomers were indiscriminately excluded from membership.

Problems of selective distribution, prepaid shipments and manufacturers' sales policy got a hot and heavy going over during a manufacturer-distributor panel headed by Jack Moore, president of Reading Batteries, and Robert S. Northington, vice president of Piedmont Aviation.

It was generally concluded that:

• Selective distribution is apparently favored by both groups with use of more than one distributor in a good sales area "good for practically all products."

• Inconsistencies exist in prepaid shipments, with manufacturers showing a definite trend toward F.O.B. destination policies to distributors, but distributors still clinging to C.O.D. methods to the ultimate customer.

Manufacturers do not clearly enough define sales policies to distributors, with dissemination of information "getting confused." Closer liaison and more consistent policies were called for.

Northington was elected to succeed Riddle as president for the coming year at the closing session. Moore was re-elected vice president for the manufacturers, and Francis L. Hine, president of Airwork Corporation, vice president for distributors. Four new directors were named to the board. They are George Tucker, Eastern Airmotive; Paul Kennedy, Southwest Airmotive; E. C. "Woody" Zug, Sensenich Corp., and E. M. Eickmann, Goodyear Tire & Rubber Co. ◆ ◆ ◆

FJ-4s on Assembly Line

Newest model of the Navy's line of Fury jet carrier-based fights, the FJ-4, is shown on the final assembly line at North American Aviation's Columbus, O. plant. The FJ-4 was engineered by the NAA Columbus division.

Fairchild Takes Wraps Off STOL Design

Privately financed Model M-232 is in final assembly stage at Hagerstown, Md.; should fly next year.

Fairchild Aircraft Division has taken the wraps off the first "solid" U.S. proposal for a STOL (short takeoff/landing) aircraft design.

The M-232, Fairchild's designation for the 100% privately financed research aircraft, is now in final assembly at the company's Hagerstown, Md. facility. Its two powerplants, Lycoming SO-580 piston engines, were installed several weeks ago and first flight should take place sometime next year.

First disclosure of the new design came recently from R. A. Darby, chief research and development engineer for Fairchild, during a talk on STOL aircraft before the Washington, D. C. section of the Institute of the Aeronautical Sciences.

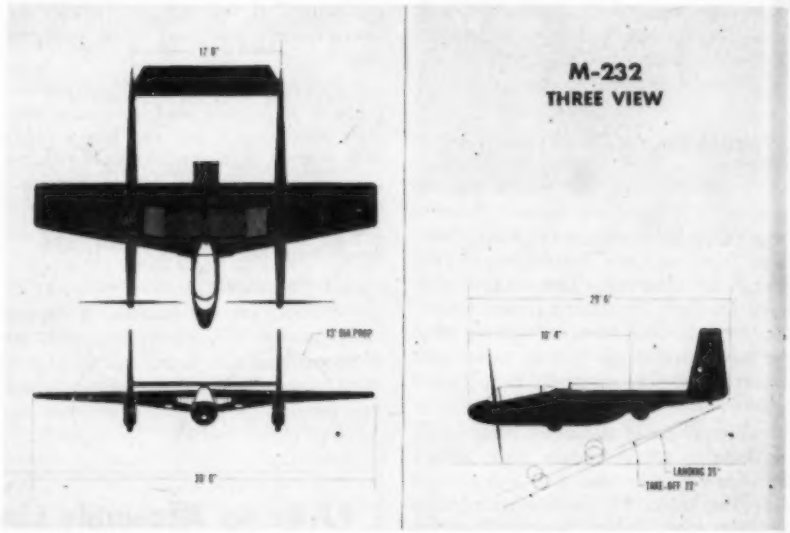
• **Darby classed** the M-232 as one of the two new STOL designs now under construction, the other being the Breguet 940 transport, for which the French government awarded a prototype construction contract in September 1954.

Like the Breguet design, the Fairchild STOL uses the "vectored slipstream" principle of developing low-speed flight. This term supplies to STOLs employing large diameter propellers for high thrust at low speed, and on which a high percentage of propeller slipstream is deflected downward by the wing, flaps or other devices.

Similarity between the U.S. and French designs, however, ends there. The Breguet 940 is a four-engine turboprop transport grossing about 14,000 pounds and having a useful load of 5,000 pounds.

The smaller M-232, which grosses half that figure (about 7,000 pounds) with a useful load between 3,000 and 3,500 pounds, is powered by two 400-horsepower piston engines and is obviously slanted at a tactical role.

Other design features of the M-232 are the familiar Fairchild twin-boom tail arrangement with rudders 17 feet between centers. Wing span is 39 ft. and overall fuselage length is 29 ft. 6 in.



THREE-VIEW SKETCH of Fairchild STOL shows twin-boom arrangement characteristic of company's C-82 and C-119 designs. Note engine/propeller hookup sketched in top view.

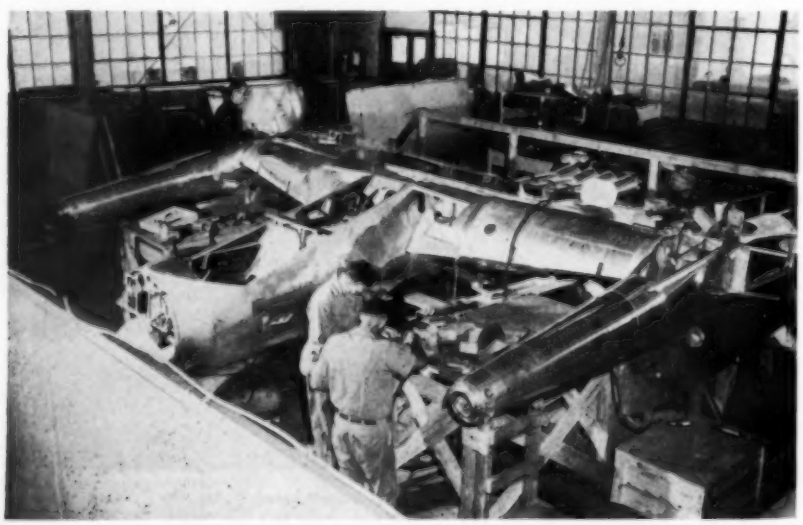
The two flat Lycoming engines are mounted in the wing at the center of the aircraft and drive two 13-foot diameter Sensenich opposite-turning and interconnected propellers. This latter feature is considered virtually a necessity for vectored slipstream STOLs to protect against asymmetric thrust resulting from engine failure, since they operate far below power-off stall speeds during takeoff and landing.

• **Propeller blades** on the M-232 are wood and the hubs permit manual variation of pitch in flight. Props will be mounted on a boom forward of the wing and connected to the engines by a drive shaft, right-angle gear box and a transverse shaft extending inboard to the airplane centerline.

Darby did not disclose specific performance data on the new STOL, but indicated takeoff/landing distance would fall well below the 500 feet used to describe this category aircraft. Presumably the M-232 will approach the performance of the Breguet 940 which will take off in 70 feet and land in 115 feet.

With this performance, plus a high-to-low speed ratio of 10 or better, the M-232 appears as a logical contender as a close support tactical aircraft or "tank-killer" that has been gaining increased attention from Army aviation officials.

Role for this mission calls for ability to operate from short, unprepared run-



FAIRCHILD M-232 ASSEMBLY as it appeared in late October. Note engine bays at fuselage centerline into which Lycoming powerplants have since been installed.

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ENGINEER'S

view...

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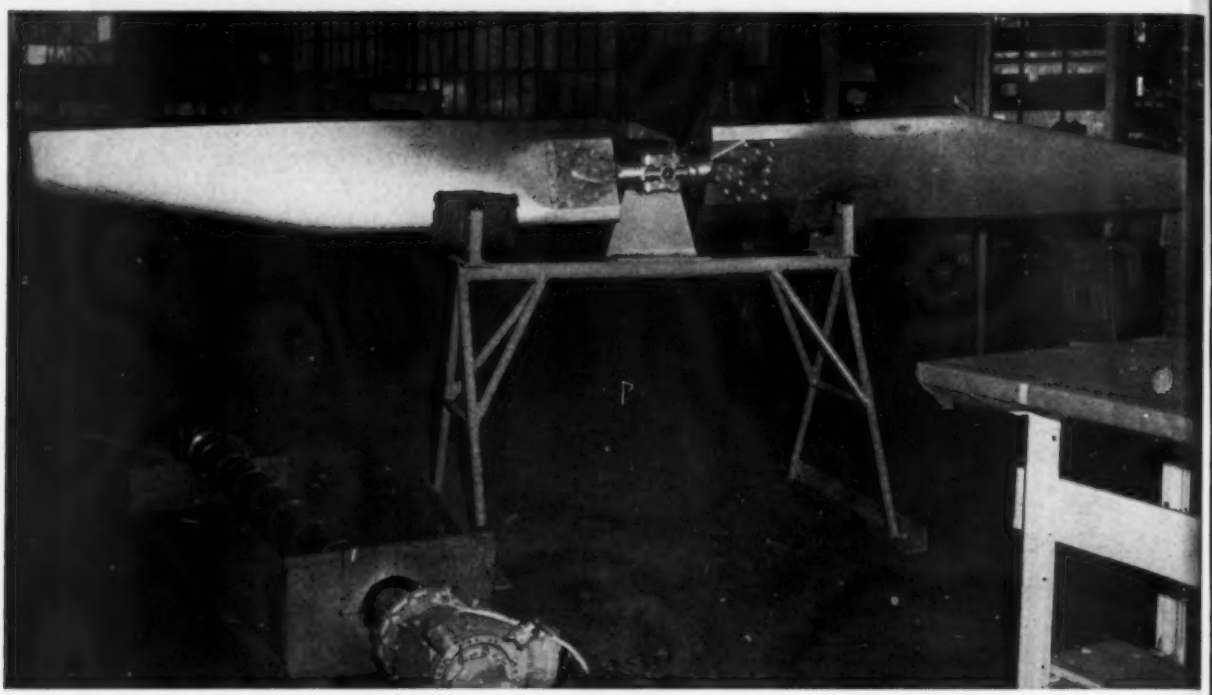


TWO SENSENICH 13-FOOT diameter wood-bladed propellers such as shown here will be interconnected on M-232 to maintain symmetrical thrust in event of engine failure at low flight speeds.

way areas, fly at relatively high speeds for its combat assignment, then re-land on the same rough terrain close behind front-line action. All are basic characteristics of STOL design toward which the M-232 has been slanted since the start of its development.

Although the new Fairchild development is nearing the roll-out stage, schedule now calls for a comprehensive ground test program before first flight. Extent of this preflight testing, coupled with the non-priority status of the private Fairchild development, could delay actual flying of the M-232 until late 1956, according to one Fairchild official.

What's STOL?

Four basic operating characteristics define the short takeoff and landing (STOL) aircraft, according to Fairchild's R. A. Darby. They are:

- Ability to clear a 50-foot obstacle in 500 feet or less for takeoff or landing while retaining about normal aircraft cruise speed for their size.
- A much wider speed range than present aircraft—a low-to-high speed ratio of 10 or better.
- Although approaching vertical takeoff and landing capabilities, they will not be designed to fly a vertical path or hover, since great benefits are believed to result from use of some horizontal distance and forward velocity.
- Use of power directly from fuel in some way during landing, whether it be by forced circulation (boundary layer control), the vectored slipstream principle, variable thrust incidence or direct turbojet support.

Congressmen Favor Drastic Punishment for Saboteurs

Three congressmen have announced intentions to sponsor legislation next month making destruction of an aircraft a Federal offense punishable by death or life imprisonment.

Stirred to action by the sabotage of a United Air Lines plane near Denver which killed 44 persons, two Representatives and a Senator—all influential legislators—have pledged personal efforts to secure the earliest possible action.

They are: Sen. Warren Magnuson (D-Wash.), chairman of the Interstate and Foreign Commerce Committee; Rep. Kenneth B. Keating (R-N.Y.) and Rep. Thomas J. Lane (D-Mass.). Keating is the second-ranking Republican on the House Judiciary Committee, which has jurisdiction over the legislation, while Lane is number three Democrat on the powerful group.

• **Keating, who** has been seeking such a law for several years and has a bill now pending before the Judiciary Committee, emphasized the interstate nature of most air transportation as justification for making plane tampering a Federal offense.

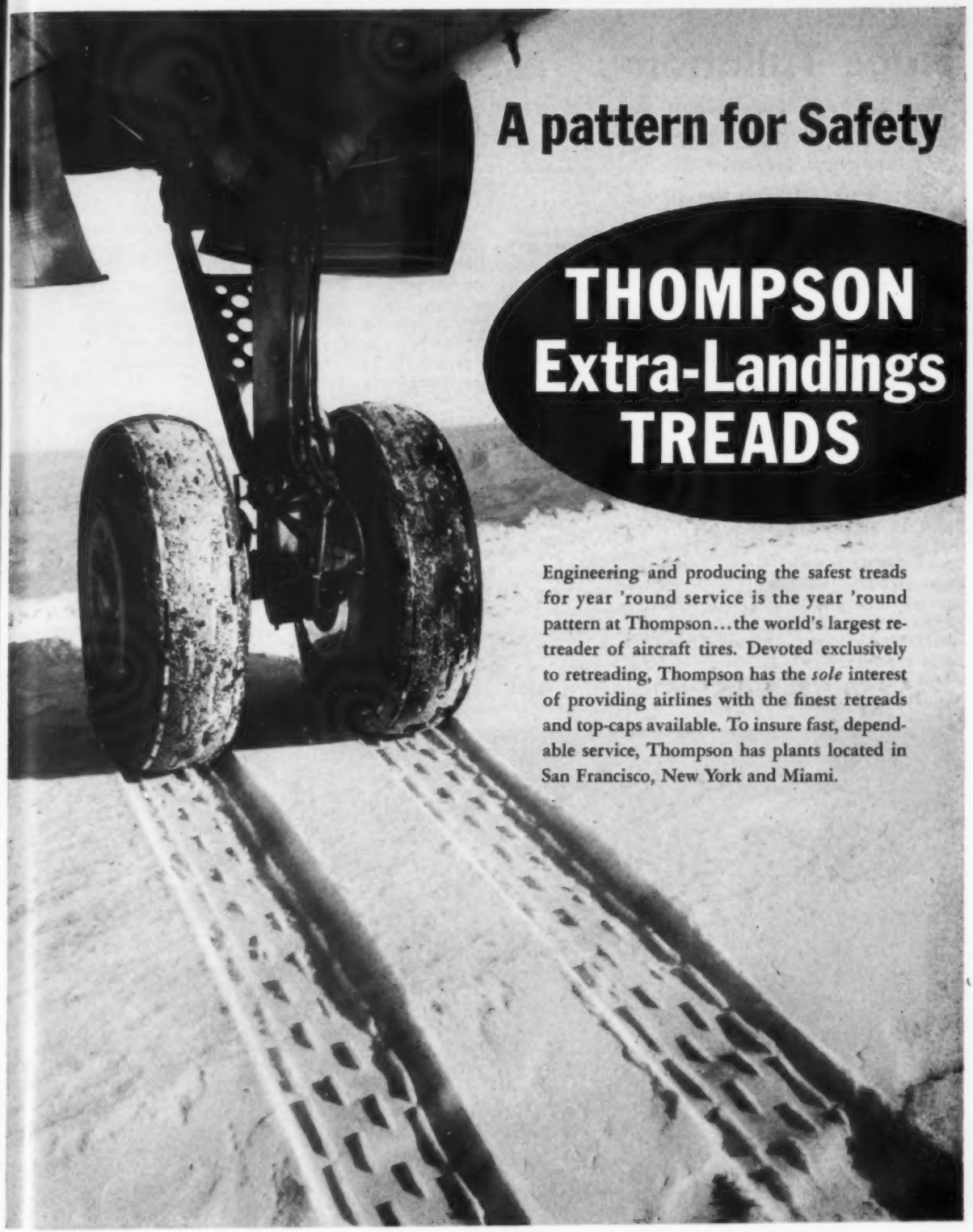
"In the present [U.A.L.-Denver] case," he said, "if the crash had actually occurred in another state or on the high seas, some very complicated jurisdictional questions would have arisen, with the possible result of restrictions on prosecuting the offender."

Under present law, he pointed out, the FBI can enter such a case only when sabotage is involved. Otherwise, he added, there is now no Federal provision dealing directly with the malicious destruction of aircraft.

Rep. Lane, who joined his Republican colleague in stressing the interstate character of airline operations, also warned of the necessity "to restore public confidence" in face of carrier inability to cope with "furtive sabotage."

• **Sen. Magnuson's announcement** revealed he had consulted with CAB Member Joseph P. Adams and had received assurance that the Board's legal staff would cooperate in drafting the legislation.

Magnuson said his draft would be applicable to destruction of railroad trains as well as aircraft.



A pattern for Safety

THOMPSON Extra-Landings TREADS

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Huge Tullahoma Test Center Taking Shape

Nation's largest aerodynamic and engine test facility has seven wind tunnels; can duplicate airflow conditions at speeds up to Mach 10.

By HENRY T. SIMMONS

The nation's largest integrated aerodynamic and engine test facility is gradually coming alive in a remote section of Tennessee: the Arnold Engineering Development Center of the USAF Air Research and Development Command.

The Center's objective: to compress into one or two months of intensive and intricate ground study the 12 to 24 months normally required for flight testing in the development of new aircraft, missiles and their powerplants.

AEDC's seven wind tunnels, six engine test cells and their related equipment are designed to duplicate airflow conditions at velocities ranging up to Mach 10, altitudes up to 100,000 feet and temperatures varying from — 120°F up to 650°F. Electric motors with an aggregate output of more than 600,000 hp will drive the long lines of compressors, exhausters, pumps and other machinery necessary to simulate extreme flight conditions.

• **Total price tag** for the Center, located near Tullahoma, Tenn., is reckoned at more than $300 million, of which more than $250 million has been appropriated by Congress. AEDC engineers figure that's a fair price to pay for the saving in development time alone which the Center will make possible, but they cite two other dividends:

• Substantial dollar savings in the development of individual aircraft and missiles. It won't be necessary, for example, to build 60 short-lived missiles for test firings when one or two may be studied through all phases of their performance in the Center's test facilities.

• Minimizing hazards to test pilots by locating flaws on the ground which would otherwise have to be discovered in actual flight tests.

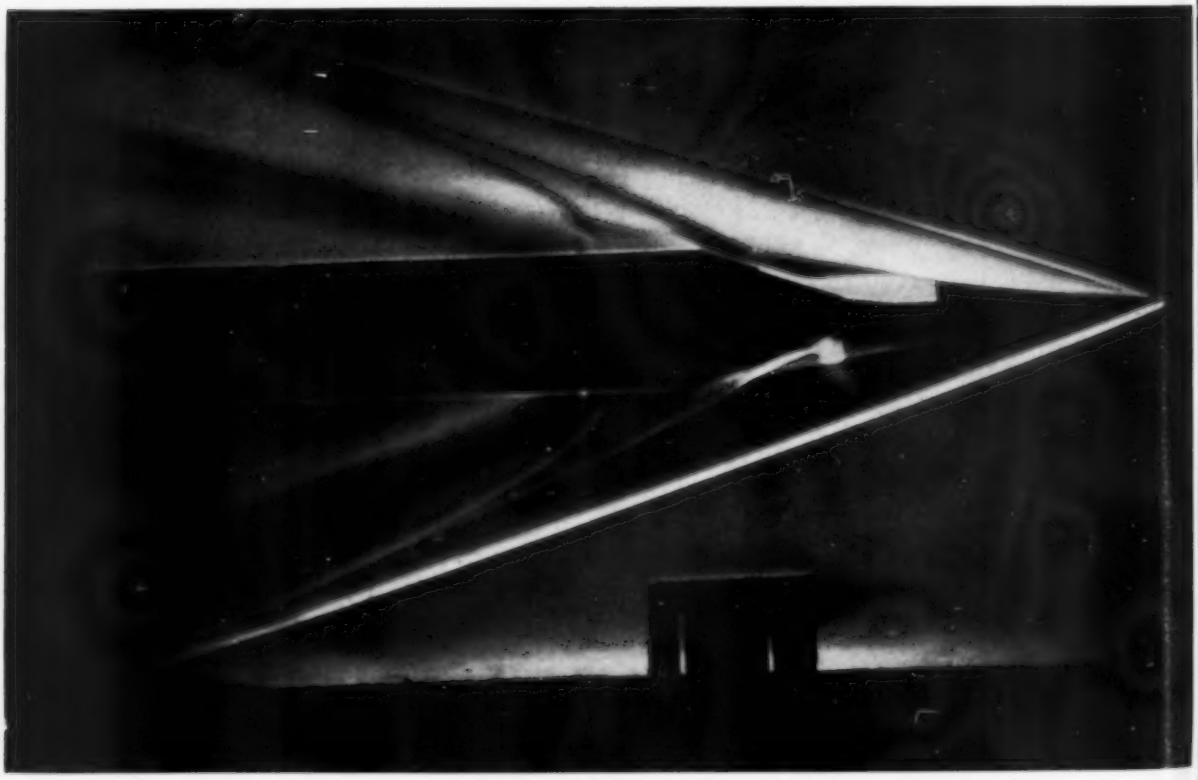
AEDC has been under construction since 1950. Its facilities are now about 70% in place, although only one wind tunnel and four test cells are presently in operation. Four more wind tunnels are expected to begin work next year and the remaining facilities in 1957 and 1958.

Operating contractor of the test center is ARO, Inc., a wholly-owned subsidiary of Sverdrup & Parcel, Inc., St. Louis, which provided the preliminary planning and much of the design work for the Center's facilities. The Army Corps of Engineers is supervising construction of the project on behalf of the Air Force.

The bulk of the Center's facilities fall into three main divisions: the Gas Dynamics Facility, the Engine Test Facility and its Ramjet Addition, and the Propulsion Wind Tunnel.

The Gas Dynamics Facility, when completed, will consist of five supersonic and hyper-sonic tunnels with cross-sections ranging up to 50 inches in diameter. Through the use of scale models placed in the high-speed airflow, the GDF facilities will closely simulate actual behavior of full-size missiles, aircraft or projectiles in actual flight.

Two of the tunnels, designated A and B, are designed for continuous airflow. Each is 40 inches square. Tunnel A will achieve air speeds of Mach 1.2 to 5.5, while B will range from Mach 4.5 to 10. Pending completion of a special test section for Tunnel B in 1958, a 50-inch section of similar Mach range



Mach 5 Shock Wave forms around a 10-degree wedge in Tunnel E-1 of AEDC's Gas Dynamics Facility.

Transonic circuit of AEDC's Propulsion Wind Tunnel. Main drive and compressor system is located to rear of circuit. Flexible nozzle will be placed in open section of the circuit next to test control building. Smaller ducting extending to the left will connect with compressor-exhauster system of Engine Test Facility to augment PWT's main drive. Supersonic circuit will be located to the right of the transonic loop.

known as B-Minor will be installed.

The other three tunnels are designed for intermittent airflow from a high pressure air storage reservoir. They are E-1 and E-2, each 12 inches square, and D, 20 inches square. E-1 has a range of Mach 1.2 to 5.5; E-2 will have a range of Mach 4.5 to 10, and D a range of 1.4 to 8.

Toughest problem in the design of the three hypersonic tunnels—B, B-Minor and E-2—is the tendency of the rapidly moving air to liquify as it leaves the hypersonic nozzles at speeds above Mach 4.5.

"To attain a Mach number of 10 in the test sections of Tunnel B and E-2, it will be necessary to heat the supply air to 1,500°F," AEDC said. "The problem of handling air at this temperature, and at the 2,500 pounds-per-square-inch pressure required to force the airstream through the 1/16th-inch wide aperture of the hypersonic nozzle, has been one of the most critical faced in designing this laboratory."

One GDF tunnel, E-1, has been in operation for 26 months. Its first test was performed on the Hughes Falcon air-to-air missile. Since then, it has studied inlet duct problems on the Republic F-103 and F-105 fighters, boundary layer problems for North American and bomb release techniques at supersonic speeds.

• **The Engine Test Facility** and its Ramjet Addition consist of six chambers for testing turbojet engines, ramjets and other powerplants at speeds up to Mach 4, altitudes up to 80,000 feet and temperatures ranging from —120°F to 650°F.

ETF itself consists of four cells which are now in operation. Cells T-1 and T-2 handle jet engines at air speeds up to Mach 2 while T-4 tests ramjets between Mach 2 and 3. The three test cells are each more than 12 feet in diameter and their lengths may be varied from 19 to 78 feet. T-5 is an open test bed for all powerplants not requiring closed cells. A 30,000 hp dynamometer will be connected to one of the cells for testing turboprop engines early in 1957.

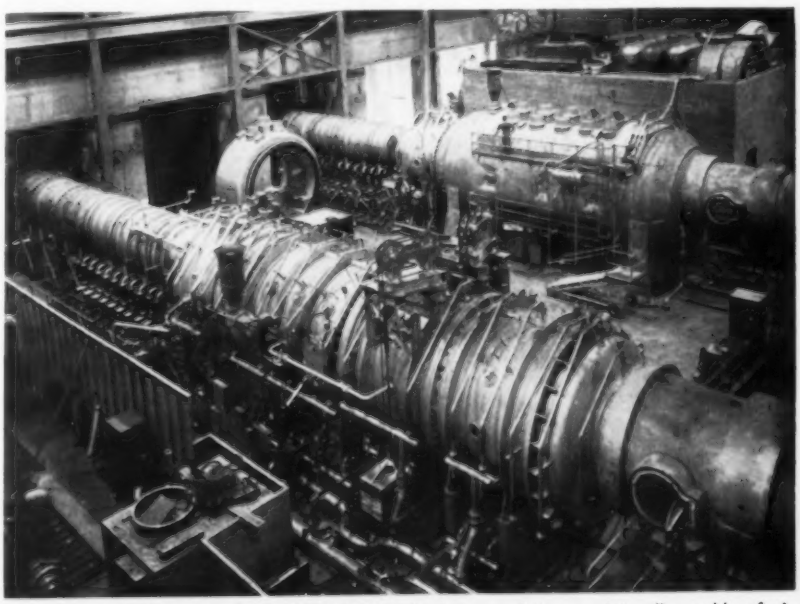
The two RJA cells, designated J-1 and J-2, will be able to handle air velocities up to Mach 4. J-1 will be 16 feet in diameter and 90 feet long, while J-2 will have a diameter of 20 feet and a length of 60 feet. Each will be able to simulate conditions throughout the full range of an aircraft flight trajectory—takeoff, climb to altitude, cruise to target, return to base and landing.

ETF has tested eight turbojet engines and several ramjets since it began operations 18 months ago. Among the turbojets were the Curtiss-Wright J67 and two versions of the General Electric J79. One of the ramjets tested was a 28-inch Marquardt model presumably intended for the Boeing Bomarc missile.

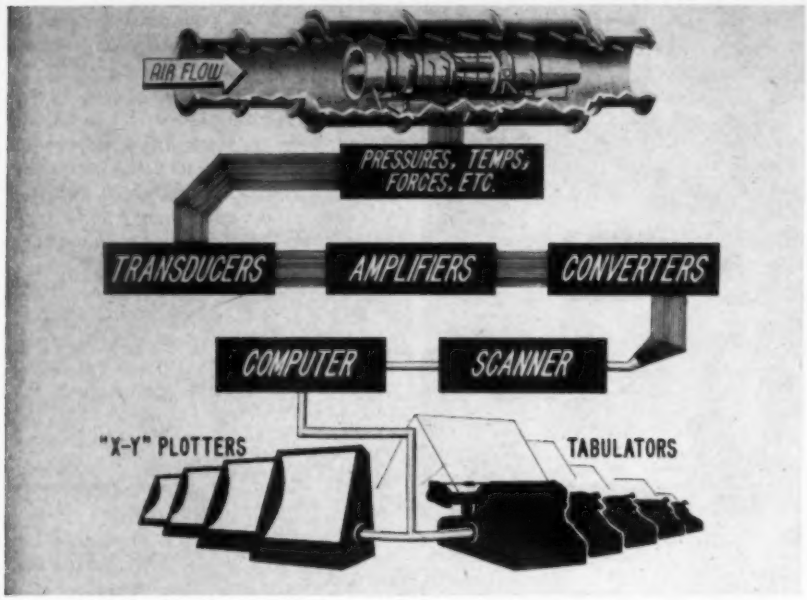
From the standpoint of minimizing hazards to test pilots, ETF has earned its keep on at least two occasions when engines failed. AEDC Commander Maj. Gen. S. R. Harris gave this description of one incident:

"Without warning, the engine threw some turbine buckets—a turbine wheel followed—and then the entire rotor of the compressor came out and destroyed itself againt the test cell walls. A fire started. The engine literally exploded. The CO_2 system put out the fire and the test cell was shut down. Except for a few switch boxes and some test instrumentation no damage was done to the test cell. No one was hurt. Data was recorded from several dozen points on the engine at the moment of breakdown.

"If this failure had occurred in a



Two test cells of AEDC's Engine Test Facility. In foreground is a ramjet cell capable of air velocities between Mach 2 and 3; cell to the rear is designed to test turbojet engines up to Mach 2. The cells are 12¼ feet in diameter and can simulate altitudes of 80,000 feet.



Each of AEDC's three major laboratories is equipped with Remington Rand Univac systems like the one above for the Engine Test Facility. The data reduction systems can gather and record up to 250 instrument readings simultaneously and reproduce the information less than five minutes after gathering it.

fighter aircraft we might have lost a pilot and a $300,000 aircraft. Had it occurred in a larger aircraft, the loss might have been a crew and an aircraft costing from $2 million to $6 million, and we would not have data to help us determine the cause of the disaster."

Although the engine which failed was not identified, AEDC noted that the engine manufacturer modified the method of attaching the turbine buckets to the hub of the turbine and provided cooling for the turbine wheel itself.

From a cost standpoint, the Propulsion Wind Tunnel is the crown jewel of AEDC. Its two huge closed-circuit tunnels, one transonic and the other supersonic, together with their vast compressor and exhauster systems will account for about $100 million of the $250 million voted for the entire Center.

PWT's transonic tunnel will explore aerodynamic and engine operating problems at speeds ranging from Mach 0.8 to 1.6. It will begin preliminary operation about next March and start regular test work next fall. The supersonic tunnel, now under construction, will provide air speeds ranging from Mach 1.5 to 5. Both tunnels will be able to simulate altitudes up to 100,000 feet over a wide range of temperatures.

Each tunnel will have a test section measuring 16 feet square and 40 feet long—generous enough to accommodate full-size guided missiles and jet-type powerplants mounted in nacelles, pods or wing sections. By mating engines with airframe sections during test runs, AEDC engineers will be able to determine the effect of the airframe on the engine's air supply as well as the propulsive effect of the engine on the structural section of the aircraft in which it is mounted.

More than 500,000 hp will be needed to operate just one of the two PWT tunnels at full capacity. This includes all the power of the adjacent ETF. Not only must all other AEDC facilities be shut down when PWT works at maximum capacity, but such testing may be performed only between the hours of midnight and 5:00 A.M. when the Tennessee Valley Authority can spare enough power for the operation.

The PWT laboratory may be the largest of its type ever built in the U.S., according to Dr. Bernhard H. Goethert, chief of PWT. He doubts the practicality of building more powerful versions of the two tunnels on the ground that small hypersonic tunnels like those of the GDF will be adequate to provide the necessary aerodynamic studies for advanced new missiles and aircraft shapes. He believes this is particularly true where rocket engines supplant air-breathing powerplants. ◈◈◈

World's Most Powerful Motors Built by Westinghouse

Westinghouse Electric Corp. claimed the honor of building the world's two most powerful electric motors for Arnold Engineering Development Center's Propulsion Wind Tunnel.

The company built two motors of 83,000 hp each for the main drive of the two PWT tunnels. Together with the two smaller starting motors of 25,000 hp each, they supply a total of 216,000 hp for the transonic and supersonic tunnels now under construction.

A common shaft connects the motors with the compressor systems of each tunnel. Its length is 574 feet—"the largest rotating mass ever attempted by man," according to AEDC.

General Electric Builds Turbo-Starters for J65s

General Electric Company's aircraft accessory turbine department is building a substantial number of self-contained turbo-starters for jet aircraft from Wright Aeronautical Division of Curtiss-Wright Corp.

The cartridge-type starters, according to W. C. O'Connell, manager of GE's accessory turbine department, will be for the Wright J65.

The small turbo-starter enables the pilot to start a jet plane by pushing a button, making auxiliary ground equipment unnecessary. Most jet aircraft are dependent upon electric or pneumatic ground power sources for starting energy, but more and more of them, O'Connell said, are utilizing self-contained starters.

The self-contained starters allow greater flexibility because jet planes can be stationed at bases where ground starting power is not available. In addition, they make it possible for many jet planes to be deployed at an airbase. The self-starting method allows faster takeoffs when tactical air support is needed in military operations.

GE's cartridge-type turbo-starter, designated the Model S-12, receives its energy from a solid propellant that is ignited electrically at the push of a button. The rapidly burning propellant produces hot gases which turn a small turbine wheel at extremely high speed. This speed is reduced by means of gearing and the energy is transmitted to the engine through a clutch mechanism.

GE also makes fuel-air combustion starters, which operate on a similar principle. Instead of a cartridge, however, jet engine fuel is mixed with air to turn over the small turbine.

With either system, O'Connell said, the jet engine is at idling speed within 30 seconds.

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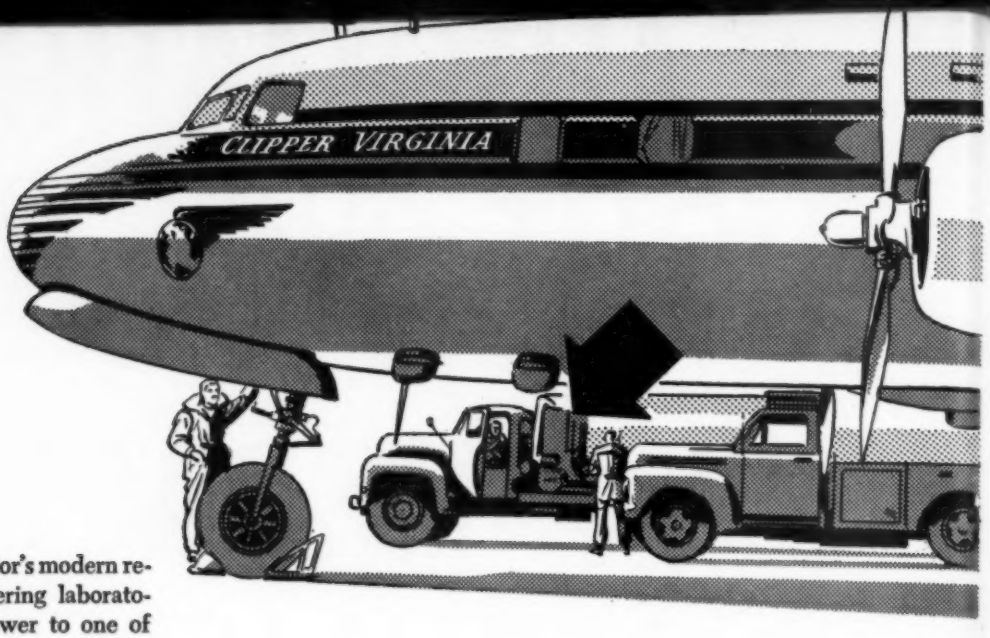

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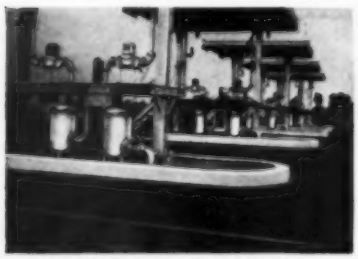

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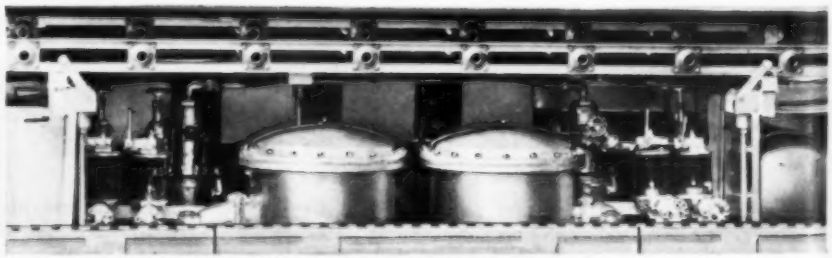

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Aerojet-General Steps Up Production Of 'Smokeless' 15KS Rocket Engine

ROCKET-ASSIST TAKEOFF—Two Aerojet-General 15KS-1000 rocket engines were used to make up for primary power loss in DC-3, right engine of which was throttled at takeoff.

Aerojet-General Corp. is stepping up its commercial JATO program following CAA certification of its new, improved 15KS-1000 rocket engine, designed specially for standby application on executive and airline transport aircraft (AMERICAN AVIATION, Oct. 24).

The 15KS produces 1,000 pounds of thrust for 15 seconds—about 400 hp. One of its big advantages is that it employs a smokeless solid propellant, thus eliminating the clouds of black smoke that accompanied firing of the old 14AS units.

External installation prints are available for the new-type JATO installations on DC-3, DC-4 and DC-6 aircraft. Southern California Aircraft Corp. at Ontario (Calif.) International Airport, is now working with Aerojet-General on the engineering for installations on other aircraft models, including a submerged mounting for twin units in Lockheed Lodestars and a single unit arrangement for twin-engine Beech 18s.

Southern California Aircraft also is making a study to determine whether it may be possible to fair the rocket engines into the rear of the nacelles on B-25 and B-26 aircraft. If so, the JATO switch could be put right next to the feathering switch in these popular executive aircraft.

• **Aerojet-General** is now preparing to revive its 250-pound thrust Junior JATO in the new configuration, using the smokeless propellant. Bill Hosier, assistant director of sales, forecasts a big market for the Junior in its improved form with crop dusters and operators of agricultural planes. It also should have advantages for many operators of Aero Commanders, Beech Bonanzas and similar types of executive and private aircraft, he said.

The 15KS-1000 rocket engine is a commercial version of the Navy MK6 Model 1. Following its recent CAA certification, the former models 14AS-1000 and 14AS-1000-G1 were discontinued.

In addition to being smokeless, the 15KS unit's high energy fuel has a controlled burning rate for constant thrust and instantly compensates for partial or complete loss of primary power. It reduces takeoff distance required by as much as 50%, normally and in emergencies, Aerojet declares.

• **The new unit** represents a substantial saving in weight over the old, 144 pounds against 206, and it has a much greater operating life. It may be carried on an aircraft with igniter connected and ready to operate for a maximum of 500 hours cumulative flying time or one year, whichever first occurs. This compares with 150 hours or one year for the old units. Maximum storage period has been increased to two years.

Aerojet-General has acquired a DC-3 which is serving the dual purpose of company executive airplane and demonstrator of a typical two-unit JATO installation. Rebuilt by Southern California Aircraft from a C-47, the plane incorporates large-size picture windows and an 18-seat configuration with office appointments. With the jet assistance, Aerojet's pilots make spectacular demonstrations of single-engine climb-outs after takeoff with the DC-3. Aerojet's price on the new commercial JATO is $500.

Specifications for 15KS-1000 Rocket Engine

Type	Cylindrical case, self-contained, solid propellant, reloadable, electrically fired		
Thrust characteristics (nominal value)			
Ambient temperatures of propellant	—65F	60F	140F
thrust, lbs.	815	1062	1320
Duration, seconds	18.0	14.0	11.5
Ignition lag, seconds	0.21	0.11	0.09
Rating, lb.-seconds at sea level	15,000		
Operating & storage temperature range	—65F to 140F		
Operating & storage altitude limit	35,000 ft mean sea level		
Propellant	Solid Al smokeless		
Principal dimensions	10.30" diameter case by 33.45" overall length		
Weight	144 pounds		
Weight, empty	72 pounds		
Ignition	24 volts, 25 amps		
Certification basis	Type Certificate No. 249		
Production basis	Production Certificate No. 405		

Navy Tests New Westinghouse Jet

Navy's Air Turbine Test Station at Trenton, N. J. has taken acceptance of two Westinghouse J54 (previously designated PD-33) jet engines for test and evaluation.

The J54, a lightweight jet developed by Westinghouse with assistance of Rolls-Royce Ltd., is rated at about 6,000 pounds thrust. The project was advanced at Westinghouse purely with its own funds and represents its bid for a lasting role in the military jet engine picture.

Final decision on adoption of the J54 in Navy aircraft will not come until some time after testing is completed, but Bureau of Aeronautics officials decline to estimate when that will be. Meanwhile, Westinghouse has been paid $1 compensation for use of the two engines during evaluation.

Fluoroflex-T (Teflon) hose helps solve space and weight problem

for Fairchild small jet engine

Big feature about small jet engines is the good power-to-weight ratio. One of the first in this field, the Fairchild J-44 turbojet engine now uses flexible plumbing that not only saves space and weight but also withstands high operating temperatures.

Fluoroflex*-T R-3800 hose assemblies were selected to do this job. And for the best of reasons: they are 500° F lines . . . corrosion-proof . . . with small O.D., extra light weight, and over 2 years of successful experience in service.

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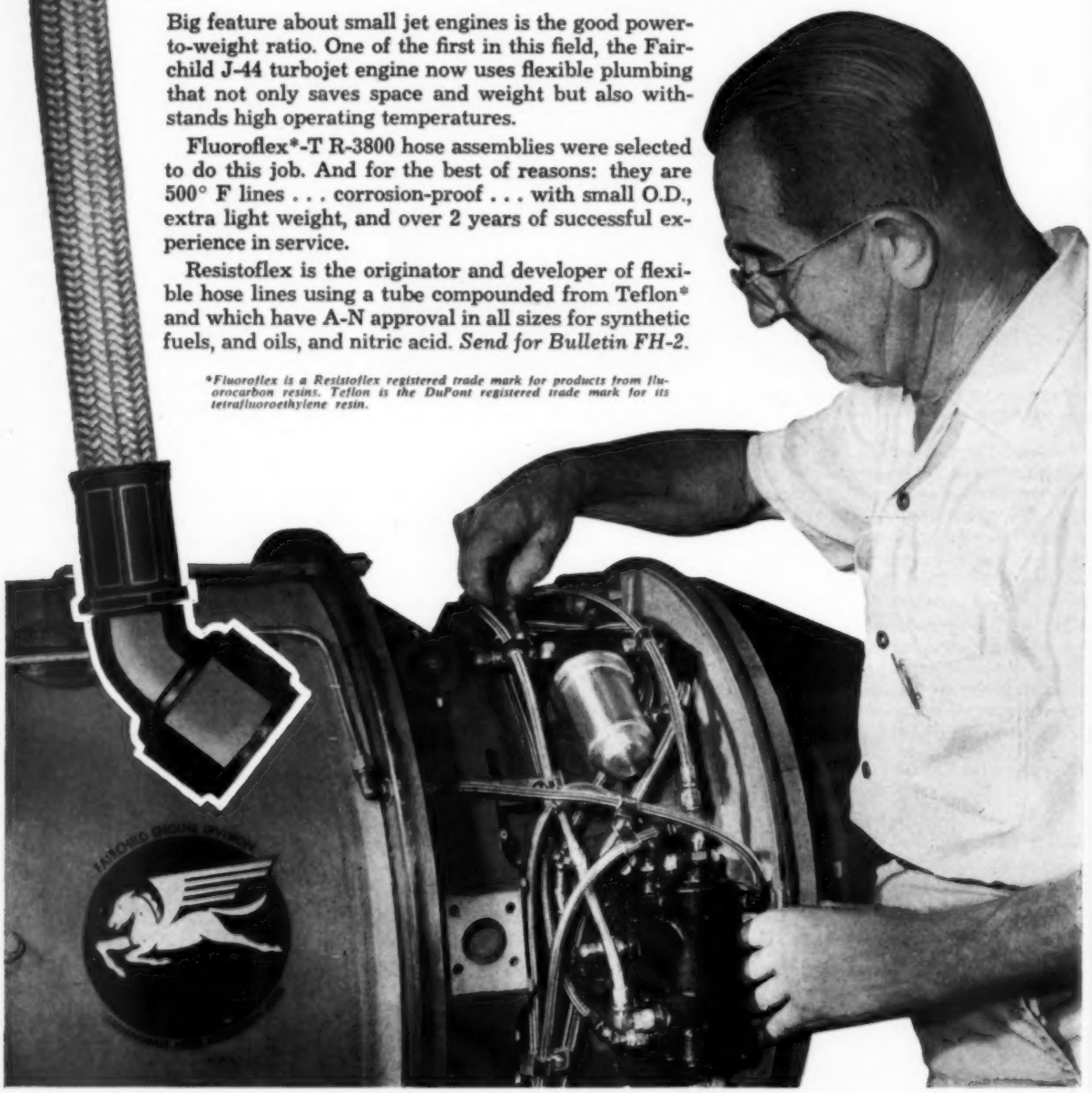

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CANARI: Systems Concept for Airline Equipment

New Wilcox package effects dramatic size and weight savings without transistors, printed wiring or sub-miniature components.

By HENRY P. STEIER

A wholly new airborne equipment concept has been announced that emphasizes the integrated system aspect to answer problems of weight, size and compatibility in electronic airborne equipment.

The CANARI (Communications And Navigation Airborne Radio Instrumentation) system developed by Wilcox Electric Co. Inc. was designed with the special needs of turboprop, turbojet and light twin-engine business aircraft in mind.

Over two years ago, the management of Wilcox took stock of its position in the design and marketing of airborne equipment and decided to go ahead with plans for a complete line of equipment to serve today's needs. The company felt that since new equipments were being added and nothing removed it was necessary to reduce the size and weight of its equipment by a large factor, and that the way to do this was through a systems concept.

• **The extent to which** the size and weight goals were met is indicated by an engineering proposal recently submitted to Lockheed Aircraft Corp. and Eastern Airlines for the Lockheed Electra. According to Wilcox, it demonstrated that use of the CANARI system would save 650 pounds radio equipment weight, and one-third the space in the Electra when compared to a radio rack installation using conventional equipment.

In another proposal to a manufacturer of light twin-engined business aircraft, the total weight suggested for complete dual airline type equipment was 160 pounds. Aircraft such as the Aero Commander, Beech 50 and Cessna 310 could use an entire system of the CANARI type.

• **Units of the CANARI system** deviate from the usual form factor to an unusual extent. While most of the units fall in with the trend to reduce unit widths in order to save rack length space, all units have been reduced in depth to a common 12½ inches. Wilcox will offer a radio rack designed and assembled at the factory complete with customer-specified radio equipment installed.

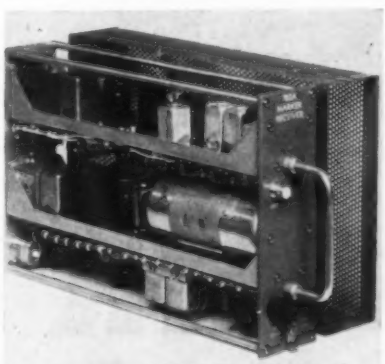
Units are designed to be rigidly mounted on the radio rack frame. The only shock and vibration isolation mounts will be located at the points where the rack assembles to the airframe. An additional shock and vibration insulator could be connected at the top of the rack where it connects to the upper part of the fuselage.

EDITOR'S NOTE: Manufacturers of airborne electronic equipment are looking to new components, design, packaging and cooling techniques that may aid them in improving space and weight efficiency. Tighter demands in these matters are being brought to the foreground by higher density seating in turboprop and turbojet aircraft soon to be in service.

At the same time, design practices such as recommended in Aeronautical Radio, Inc.'s recent report No. 403, "guidance for Designers of Airborne Electronic Equipment," have proved their importance to long equipment life, reduced maintenance costs and maximum service time between overhauls. Designers are beginning to return to their "boards" to restudy what can be done to meet the new demands, and yet meet established design practices.

AMERICAN AVIATION *has taken a look at the current status of equipment developments and plans of three manufacturers. This is the first of three articles dealing with these developments.*

For users who want to mount equipment not corresponding to the Wilcox form factor, a compatibility kit could be provided. This would be in the form of an aluminum frame that plugs into the rack frame to permit compatibility mounting of units with a different form factor.



Marker receiver of the CANARI system. The dynamotor shown between the chassis would not be used in an installation that employed a common power supply source for this and other units of the system.

Also, a factory constructed rack could, at customer option, be provided with an exhaust plenum ducting connected to a duct incorporated in the airframe if such ducting is part of airframe design. The Electra will use exhaust ducting.

Even though equipments are being designed to survive higher ambient temperatures, a condition such as the close proximity of the co-pilot to the radio rack in the Electra makes crew discomfort an important factor. Thus, under conditions where the seating density has been increased by pushing the passenger compartment farther forward, the crew is likely to suffer from high temperatures and exhausting the heat out of the aircraft is an important factor.

• **Units of the integrated system,** their size, weight and general characteristics are:

• 700B ILS glideslope receiver with 20 crystal controlled channels, ¼ ATR, 6 lbs.

• 701A ADF receiver, ½ ATR, 13 lbs.

• 702A marker beacon receiver, "three light" 75 mc, ¼ ATR, 4½ lbs.

• 704T high frequency transmitter, 10 crystal-controlled channels, 50 watts, 2 to 14 mc, ¾ ATR, 13 lbs.

• 704R high frequency receiver, 20 crystal-controlled channels, 2 to 18 mc, ½ ATR, 10 lbs.

• 704M modulator for 704T HF transmitter, ¼ ATR, 5½ lbs.

• 705A VHF communications receiver, 560 crystal controlled channels, 50 kc spacing from 108 mc to 135.9 mc, 3/8 ATR, 10 lbs.

• 706A navigation receiver. This unit combines the 705A receiver with phase and tone circuits to provide VOR and ILS functions as well as communications, ¾ ATR, 16 pounds. Installation of omni-bearing indicator is optional.

• 707 VHF transmitter, 360 crystal controlled channels, 25 watts output, 50 kc channel spacing from 118 mc to 135.9 mc, 3/8 ATR including modulator, 13 lbs.

• 708A public address amplifier, 12 or 25 watts, ¼ ATR, 8 lbs.

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• 711A computing automatic tracker approach coupler, ¼ ATR, 2 lbs.

• 712A AC power supply, ¼ ATR, 5½ lbs.

• 714A radar safety beacon transponder, ½ ATR, 25 lbs.

• **The remarkable reductions** in weight and size of CANARI units was achieved by careful attention to the mechanical aspects of the system, component selection and careful handling of the system concept with regard to power supply arrangements.

Perforated equipment covers of .010-inch thick stainless steel are used on all units. Ordinarily perforated covers are viewed skeptically, since such covers do little to discourage accumulation of dust on internal parts. Dust can be a big problem causing radio frequency losses, dc leakage, and corrosion. However, utilization of convection currents for cooling can be managed with perforated covers. The CANARI equipments use no fans and motors for forced air cooling of components.

Elements of the equipment likely to be affected by dust were individually sealed to protect them. Relays, for example, were either covered or hermetically sealed.

• **To reduce heat dissipation,** careful attention was given to grouping of vacuum tube filament circuits. Inclusion of voltage-dropping resistors, which produce heat in a series string arrangement, was kept to a minimum. Equally careful study was given to voltage-dividing resistors. A good example of heat reduction is the redesign of inductor circuits which in previous designs had carried both ac and dc loads simultaneously. By shunt-feeding the circuit and eliminating dc through the inductor, the weight and physical size of the inductor, as well as heat production, were reduced.

ARINC-approved tubes are used. No subminiature tubes, transistors or vacuum tube diodes are used. Silicon rectifiers are used for power rectification, and semi-conductor diodes are used for voltage rectification. These devices reduce heat.

Each vacuum tube of the system was examined for envelope temperature. Temperature of tube envelopes affects their reliability. It was considered desirable to maintain tube temperatures well below the manufacturer's rating. Where needed, "black body" shields were installed to aid in heat dissipation. These recently introduced shields employ the old principle that good absorbers of energy are also good radia-

and then we built

. . . a propeller pitch control transmission assembly for Beech Aircraft Corporation.

In order for the hydraulic motor to function properly, the tolerances on practically all of the dimensions had to be held to within .0001″ or .0002″ for squareness, parallelism and concentricity.

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USAF HERCULES

The major problem in paradropping emergency supplies has been the unavoidably wide dispersal of small, individually-parachuted cargo units.

Tactical Air Command will lick this problem handily with the new Hercules C-130 transport built by Lockheed. This combat cargo carrier has the capacity to haul up to 25,000 pounds and paradrop it in a matter of *seconds*. Using the newest-developed aerial delivery techniques, this huge cargo load can be precision-dropped onto virtually any small space.

Powered by four Allison T56 turbo-prop engines, the Hercules is more than 19 times as productive as World War II twin-engine transports... and capable of flying cargo and men *farther, faster and at lower cost* than any other present-day combat transport. It's now being manufactured in quantity for the United States Air Force at

GOVERNMENT
AIRCRAFT PLANT NO. 6

LOCKHEED

AIRCRAFT CORPORATION

Georgia Division, Marietta

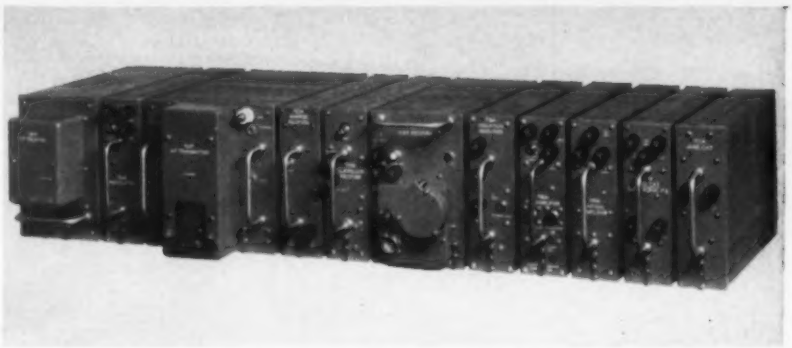
tors. With a black rough surface, the new shields reduce envelope temperatures.

• **Principles of airframe design** practice were used to produce light weight, yet rigid, assembled equipment units. Lightening holes were made in sheet metal parts and in castings. Flanges, gussets and joggling were applied to stiffen assemblies and covers.

Electrical components for the CANARI system were chosen from those that carry MIL approval, and parts were derated as necessary to meet environmental conditions. Each equipment unit was checked through the ambient temperature range of minus 55 to plus 70 degrees centigrade at simulated altitudes up to 30,000 feet.

Humidity checks were run at 50 degrees centigrade in a relative humidity of 95 plus or minus five percent for 48 hours. All CANARI chassis are treated with the Iridizing process for corrosion resistance. The process is said to result in a coating with zero resistance to both radio frequency and direct currents.

Only one magnetic amplifier is used in the entire system. This is in the CAT (Computing Automatic Tracker, final approach coupler). The "mag-amp" replaces the tubes and chopper circuit. The total number of tube types used was kept to a minimum to aid in the reduction of the equipment user's inventory costs.



The CANARI integrated system of communication and navigation instrumentation. Left to right: HF receiver, modulator, HF transmitter, marker receiver, glideslope receiver, ADF receiver, isolation amplifier, PA amplifier, mixing amplifier and two units of the CAT (Computing Automatic Tracker final approach coupler). VHF equipment would fit same form factor.

Modular and unitized circuit construction is regarded by Wilcox as generally necessitating additional connectors which in turn can contribute to reduced reliability and increased maintenance.

• **A major feature** of the integrated system concept as applied to the CANARI system is the provision for electrical power. For example, the standard B-plus plate voltage was set at 250 or 500 volts. Individual power supplies for each equipment can be eliminated and a system supply offered. This power supply system can be operated from 28 volts dc or 400 cycle ac mains in an aircraft.

Wilcox proposes that power supplies be carried in duplicate, with either supply of sufficient capacity to power the entire system. Or, a dual power supply could be provided for each radio rack shelf. To allow for other options, most of the equipment has been designed to incorporate internal

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Photo courtesy of Republic Aviation Corp.

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The Peirce Airborne Voice Recorder Model RD-106/ANH-2 is used in jet aircraft to record pilot observations in flight operations by the USAF and other military services.

With the cooperation of the Communications and Navigation Laboratory at Wright Air Development Center, Peirce developed this unit for making voice, radio set and intercommunication recordings in all flight, weather and altitude conditions. A 60 minute removable, reusable magazine is used.

Model RD-106/ANH-2
Size: 5½" x 6½" x 9⅛"
Operating Voltage: 27 Volts D.C. at 2.5 amperes

The Peirce engineering staff is available to you for consultation on any problem you may have regarding airborne voice recordings. Put them to work for you now! Write, wire or phone:

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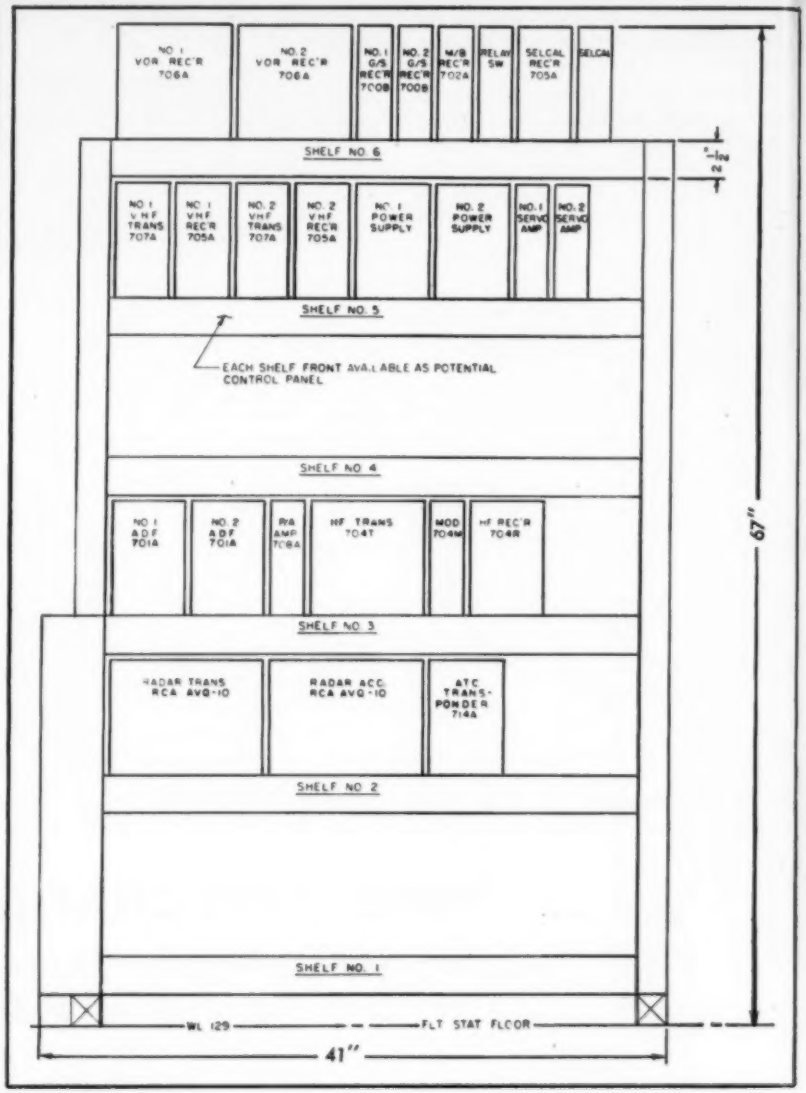

Proposed dual installation of the CANARI system in a Lockheed Electra aircraft. Conventional equipment usually occupies all six shelves. With the CANARI system, two shelves would be restored to the user for additional equipment such as a terrain warning device.

individual power supplies for a power source of 400 cycles or 28 volts dc.

• **The Electra** will carry very little provision for dc equipment. Only a 30-ampere hour battery will be carried. In that aircraft the CANARI system would use a common radio rack power supply using ac power from the Electra's alternators. There will be an alternator for each engine.

For the CANARI system the conventional junction box has been eliminated. Junction wiring between units is accomplished in a channel directly behind the rear panel plugs of each equipment unit. System cables are terminated in plugs that can be attached to mating connectors on a suitable bulkhead in the airframe. From there, connections would go to the power source, antenna circuits, main control panel, etc. This neat system of assembly to the airframe and its circuits offers advantages in allowing removal of the entire rack as a unit for servicing and major modifications.

Although the ADF unit uses mechanical tuning now, electrical tuning will be available later. HF and VHF units have electrical tuning. Type 706A navigation receiver, still in development, will combine the 705A VHF receiver with essential phase and tone circuits for VOR and ILS functions. The VHF transmitter, also in development, will have 360 crystal-controlled channels, 25 watts output and 50 kc channel spacing from 118 mc to 135.9 mc.

The only unit in the CANARI system not designed by Wilcox is the radio beacon transponder. Rights to manufacturer and distribute this equip-

With the touch of a finger...

sea level comfort for The Golden Falcon

Aboard Eastern Airlines new DC-7B Golden Falcons the flight engineer can create maximum pressurized comfort with a touch of a finger. A new AiResearch cabin pressure control system makes this possible.

Working with Douglas engineers, AiResearch designed a pneumatic butterfly outflow valve for the Eastern DC-7B fleet. The outflow valve was developed for a ducted installation and is connected by a small air line to a lightweight AiResearch controller located at the flight station. The new valve permits cabin pressure to be *its own source of power* — the basic pneumatic principal of all AiResearch pressurization systems.

Eastern Airlines reports that the new system has already passed the 1000 hour mark of trouble free operation and that passenger reaction has been most favorable. Dependability, compactness and easy maintenance are other features which made this integrated system a must for Eastern's new DC-7B's. In the field of integrated aircraft systems and specialized components AiResearch has more experience than any other company.

Qualified engineers in the fields listed below are needed now. Write for information.

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NORTH AMERICAN HAS BUILT MORE AIRPLANES THAN ANY OTHER COMPANY IN THE WORLD

SEPTEMBER, 1948 – F-86 SABRE JET – 670.981 MPH
NOVEMBER, 1952 – F-86D SABRE JET – 698.505 MPH
JULY, 1953 – F-86D SABRE JET – 715.697 MPH
FW-754
OCTOBER, 1953 – F-100A SUPER SABRE – 755.149 MPH
FW-709
AUGUST, 1955 – F-100C SUPER SABRE – 822.135 MPH

NEW AIR SPEED RECORD MARKS U. S. SUPERSONIC SUPREMACY

Year after year, record performances by Air Force pilots in North American planes help confirm our nation's superiority in the air.

Now, the *first supersonic* speed record—set by Col. H. A. Hanes in a North American F-100 SUPER SABRE* at a faster-than-sound 822.135 m.p.h.—is powerful, new proof of our Air Force's Supersonic Supremacy.

F-100s like today's record-holder have been delivered in quantity to the Air Force, and are now flying from U.S. Air Bases in America's first Supersonic Squadrons. They defend our skies as day fighters, fighter-bombers and in other specialized tactical missions. These ranks grow stronger daily with new F-100s from North American's Los Angeles and Columbus, Ohio plants.

Another example of the research, development and production leadership that keeps North American in the forefront of aircraft, rocket engines, guided missiles, electronics and peaceful applications of atomic energy.

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Engineering Ahead for a Better Tomorrow

NORTH AMERICAN AVIATION, INC.

*Reg. U.S. Pat. Off.

ment were purchased recently by Wilcox from the Melpar Inc., division of the Westinghouse Air Brake Co. Wilcox says the airline need for this equipment is so urgent that the long time necessary to redesign it to the new form factor is not justified. They regard the transponder as a prime safety need and so will offer it first in the standard 19⅝" ½ ATR case. Later it will be redesigned to fit the new Wilcox form factor. ◈◈◈

Electronotes

• **Latest of the "-ics" is "autonetics."** North American Aviation has announced establishment of an Autonetics Division for development and production of automatic navigation systems for missiles, and aircraft, autopilots, armament control, computers, data processing, and controls for machine tools. The division will occupy facilities near North Americans' Downey, Calif. plant.

• **Collins Radio Co.** has announced that it will market airborne distance measuring equipment (DME) for use with existing CAA civil ground stations. The equipment is being designed by National Aeronautical Corp. to Collins' specifications and standards to insure that the equipment will be compatible with other Collins equipment.

• **Three Univac-Scientific** data processing machines designed by the Remington Rand Division of Sperry Rand Corp. are being installed by the Air Force at its Arnold Engineering Development Center in Tullahoma, Tenn. The machines will process data from engines, scale and full-sized models of aircraft, and guided missiles while they are under test.

• **Weight of the Bendix** synchronizer-power supply for their weather-mapping radars has been reduced by seven pounds. Number of vacuum tubes is now 19 instead of 32. The new SYN-1B unit, designed to operate with industry-standardized gyro output voltages, is 50 per cent smaller than the previous one. Weight of a single indicator radar system with shockmounts is now 117 pounds.

• **An artificial target** for testing airborne radar is being used to determine radar performance in ground checks. A high Q resonant cavity is coupled to the radar's transmission line through a directional coupler or with a pickup antenna. When the radar transmits a pulse, the "echo box" made by Narda Corporation stores the energy and then returns it to the source, thus permitting overall circuit measurements for analyzing system performance.

• **Two Spar** precision approach radars have been delivered to the Navy for use in "Operation Deepfreeze," latest Antarctic expedition under command of Rear Admiral Richard E. Byrd, for use at the Antarctic landing strips in the Little America region and 500 miles away in the McMurdo Sound area. The radars, made by Laboratory for Electronics, Inc., will aid Navy aircraft operating with the expedition.

• **All technical development reports** issued by CAA henceforth will be disseminated by the Office of Technical Services, Department of Commerce instead of the Technical Development and Evaluation Center of CAA. A nominal fee will be charged for the reports, which will be listed in the monthly publication of OTS, *U.S. Government Research Reports.*

• **Information designed** to serve the current interest in single-sideband systems for more efficient use of available radio frequency channels has been published by Eitel-McCullough, Inc. A bulletin, *Single Sideband,* published by "Eimac" tells how tube ratings for such service can be calculated, and provides guidance on selection of tubes, amplifier design and procedures for adjustment and monitoring.

Micro-ohm Resistance is uniformly LOW when Aluminum is Deoxidized for Spotwelding with NEW, patented KELITE PROCESS 822

KELITE exclusive, patented* PROCESS 822—a liquid miscible in water—removes oxides and scale and prepares aluminum alloys for resistance, spot and seam welding.

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PROCESS 822 qualifies for Class I Aircraft Welding.

*U.S. Patent No. 2,710,792

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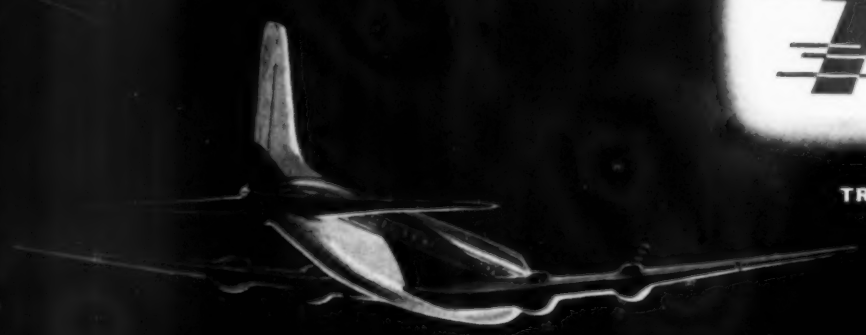

More and More Leading Air Lines

are installing

RCA's New Weather Radar

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OVERSEAS AIRWAYS CORPORATION

Simplicity, light weight, efficiency and dependability are the reasons for this preference

More and more leading air lines are equipping their ships with RCA's new weather-mapping radar. Their choice has been based upon exhaustive comparisons.

RCA's AVQ-10 is the first airborne radar to use C-Band (5.6 cm) transmission, the wave length most suitable for "looking into" storms, yet having the least amount of scope clutter. It presents the pilot with an easily-interpreted display of storm conditions around him. In addition, it gives the pilot valuable ground-mapping information.

In terms of time saving and increased passenger comfort, the RCA AVQ-10 weather radar is more and more becoming a "must" among air lines. With it, pilots can "see" into storm areas many miles ahead and pick non-turbulent paths between them, often making long and costly detours unnecessary.

RCA is proud that these distinguished air lines have chosen the AVQ-10 to save time and increase passenger comfort. Every effort will be made to meet additional commitments occasioned by the great and growing demand for this equipment. To assure early installation, other air line and private operators are invited to write immediately for further particulars on the RCA AVQ-10. Overseas customers should get in touch with the RCA International Division, 30 Rockefeller Plaza, New York City, or any RCA International Distributor.

Dotted line shows how airplane passed between storm cells in its flight path.

Minutes and miles are saved when a pilot is able to find a smooth path through turbulent areas.

AVQ-10 antenna mounted in nose of airplane scans the forward areas, enabling the pilot to evaluate storm conditions far ahead.

RCA

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Pulse Of The Industry

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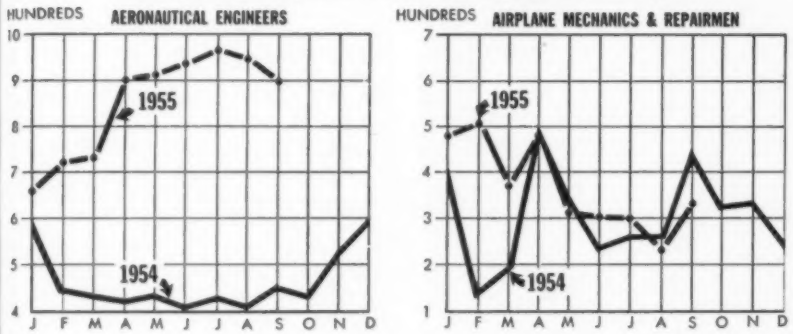
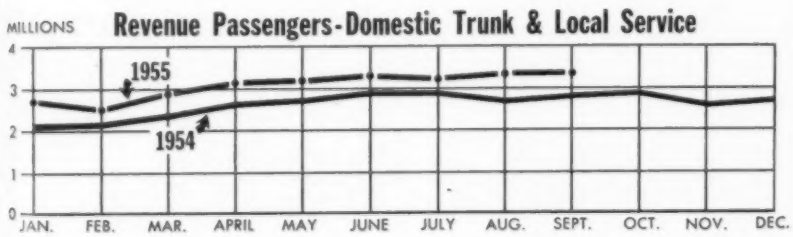
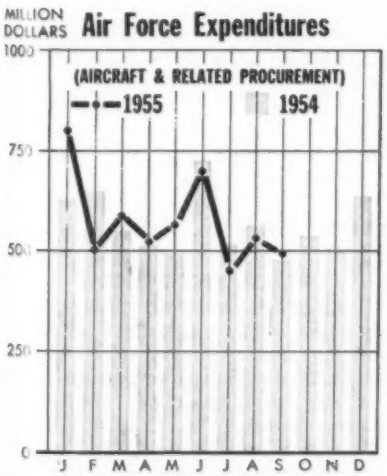


Airlines Employment

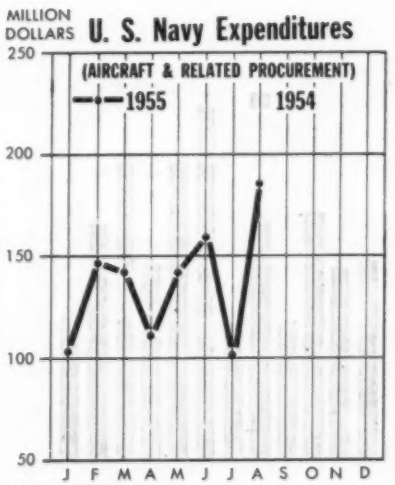
Revenue Passengers-Domestic Trunk & Local Service



Air Force Expenditures



U. S. Navy Expenditures



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Six airlines have already made the switch from old fashioned leather binders to our new and modern electronically welded vinyl binder.

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Write us today for samples and our list of magazine publishers who will cooperate in furnishing free binders, magazines, or both.

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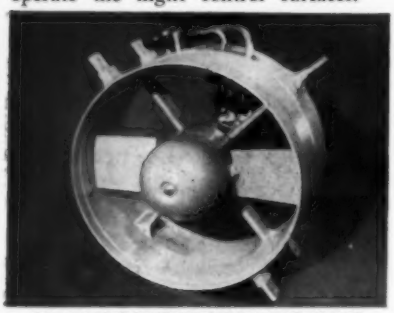
New Products and Processes

THREE RAM-AIR-DRIVEN UNITS DEVELOPED BY AEROPRODUCTS

Three new ram-air-driven products have been developed by **Aeroproducts Operations, Allison Division of General Motors.**

One is a hydraulic pump that supplies sufficient power to operate hydraulic flight controls necessary to fly and land an aircraft in an emergency. An undisclosed number of these pumps are being supplied for installation on North American's F-100 Super Sabre.

Driven by a two-bladed variable pitch propeller, the pump incorporates a simple fly-weight type of governor that maintains a constant rpm of the pump drive shaft by mechanically changing the pitch of the propeller blades. In an emergency the air stream is diverted over the propeller blades and in less than two seconds the pump delivers sufficient hydraulic power to operate the flight control surfaces.

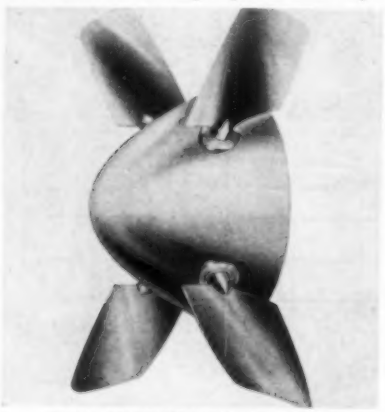


RAM-AIR-DRIVEN HYDRAULIC PUMP

Another new product developed by Aeroproducts is a ram-air-driven generator capable of generating sufficient power to operate flight control surfaces necessary to fly and land an aircraft in an emergency, and also to operate electric instruments and equipment necessary for flight. As with the hydraulic pump, the generator is driven by a two-bladed variable pitch propeller incorporating a simple governor that maintains a constant rpm of the generator rotor.

RAM-AIR-DRIVEN GENERATOR

Third new product is a ram-air-driven emergency power unit with four automatically controlled variable pitch propeller blades. This power unit has been specifically designed for application on a new high performance jet aircraft and is capable of developing 44 hp at a constant driveshaft rpm. Propeller blades are 22 in. in diameter, so that the unit is adaptable to driving either electric generators or hydraulic pumps.



RAM-AIR-DRIVEN POWER UNIT

Circle No. 150 on Reader Service Card.

COOLING FAN

A motor-driven cooling fan of revolutionary design, which will operate for long periods at temperatures up to 260°F, is being produced for Motorola, Inc. by **The Garrett Corp.'s** AiResearch Manufacturing division. In initial tests, a number of these fans completed 1,000-hour endurance runs without a failure.

A combination of three of the new fans, along with an AiResearch heat exchanger, cools Motorola's newly designed pressurized indicators for radar sets currently being installed in Air Force jet bombers.

The AiResearch unit won out in competitive performance tests because its engineers had designed an integral case around the motor so that heat could easily be taken out by the fan's air action. The unit did not overheat, nor did its greased-packed bearings burn out at the high temperatures.

The tiny fan turns at a top speed of 10,000 rpm and weighs a fraction over a pound. Fan wheel diameter is 2⅜ in. Diameter of the unit itself is 2⅞ in. Length, between the flanges, is 2⅝ in. and overall length is 3 3/16 in.

Circle No. 151 on Reader Service Card.

INCINERATING TOILET

A lightweight, odorless incinerating toilet for airplanes is being produced by **Research Products Mfg. Co.** The unit requires no water.

A cellophane liner is placed in the bowl, manually or automatically, depending on the model. After use, the flush lever is actuated and the bowl doors and incinerator doors open, allowing the liner and contents to fall through to the incinerator compartment. Upon completion of the incinerating cycle, an automatic timer turns off the electric power. Residue ash is completely inorganic, according to the unit's manufacturer. It is disposed of automatically, so that no servicing of the unit is required.

Dallas Aero Service has been appointed exclusive distributor for the executive plane field.

Circle No. 163 on Reader Service Card.

RESISTANCE DECADE

Industrial Instruments, Inc. is offering a new resistance decade with seven dials in decade steps of 0.1.1,10,1000,-10,000. Decades may be ordered with dial steps of nine or ten. The instrument is housed in a rubbed hardwood case with a bakelite panel.

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(*Continued on Page* 54)

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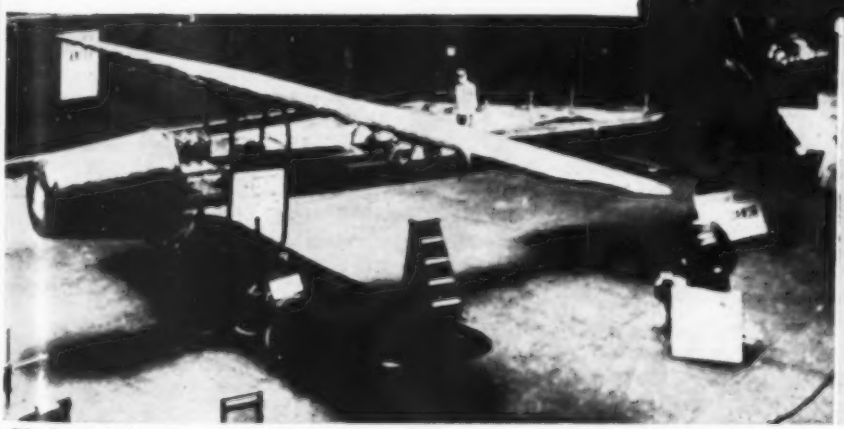
WHAT DO YOU KNOW ABOUT AVIATION...

Who Was the Father of Jet Aviation?

Far back in 1909, a young Frenchman decided that there could be a different type of aircraft other than the then currently accepted "kite" models. Putting his ideas to work, he built a plane powered by a turbo-propulsor, with a fuselage of slender silhouette, a delta-form tail assembly, a retractable landing gear and wings of polished plywood. In April, 1910, his revolutionary plane took off – and flew. The young man's name was – and is – Henri Coanda.

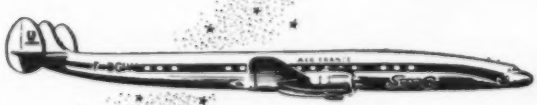
Today his ideas have reached fruition in the modern age of jet transportation. Still active, he typifies the spirit that has kept France to the fore of international aviation . . . the spirit that has enabled Air France to successfully serve the people of 76 countries for 37 years.

Henri Coanda today.



The first Jet aircraft.

The jet turbine of the Coanda motor designed in 1909.



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RAAF TRAINS ON LUND-POWERED WINJEEL
Here's
Australia's newest trainer . . .
the Winjeel. Built by Commonwealth
Aircraft Corporation of Melbourne . . . powered
by Lund who supplies the complete pod, ready for
installation, including Pratt & Whitney R-985-ANI en-
gines, Hamilton Standard propellers and quick change units.
The Winjeel typifies Lund's world wide activity in supplying
newly-overhauled engines from a factory authorized shop, Com-
plete with any desired accessory grouping . . . without delays.
Years of Personal Performance
Are the Foundation of
Lund Aviation, inc.
230 PARK AVENUE, NEW YORK 17, N.Y., U.S.A.
Millville, New Jersey
Montreal, Canada

Circle No. 23 on Reader Service Card.

NEW PRODUCTS

(*Continued from Page 52*)

LINEAR ACTUATOR

Airborne Accessories Corp. has announced a new ac or dc linear actuator, Model R-584, rated at 650 lbs. maximum operating load, 2,000 lbs. ultimate static load and weighing only 2 lbs. The actuator conforms to MIL-A-8064 Spec.

Circle No. 153 on Reader Service Card.

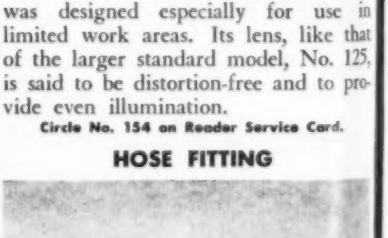
INSPECTION AID

Two models of the Magnavision inspection and assembly aid are offered by **Engineering Developments, Inc.** for aviation, electronics and other applications.

The smaller bench model, No. 195, was designed especially for use in limited work areas. Its lens, like that of the larger standard model, No. 125, is said to be distortion-free and to provide even illumination.

Circle No. 154 on Reader Service Card.

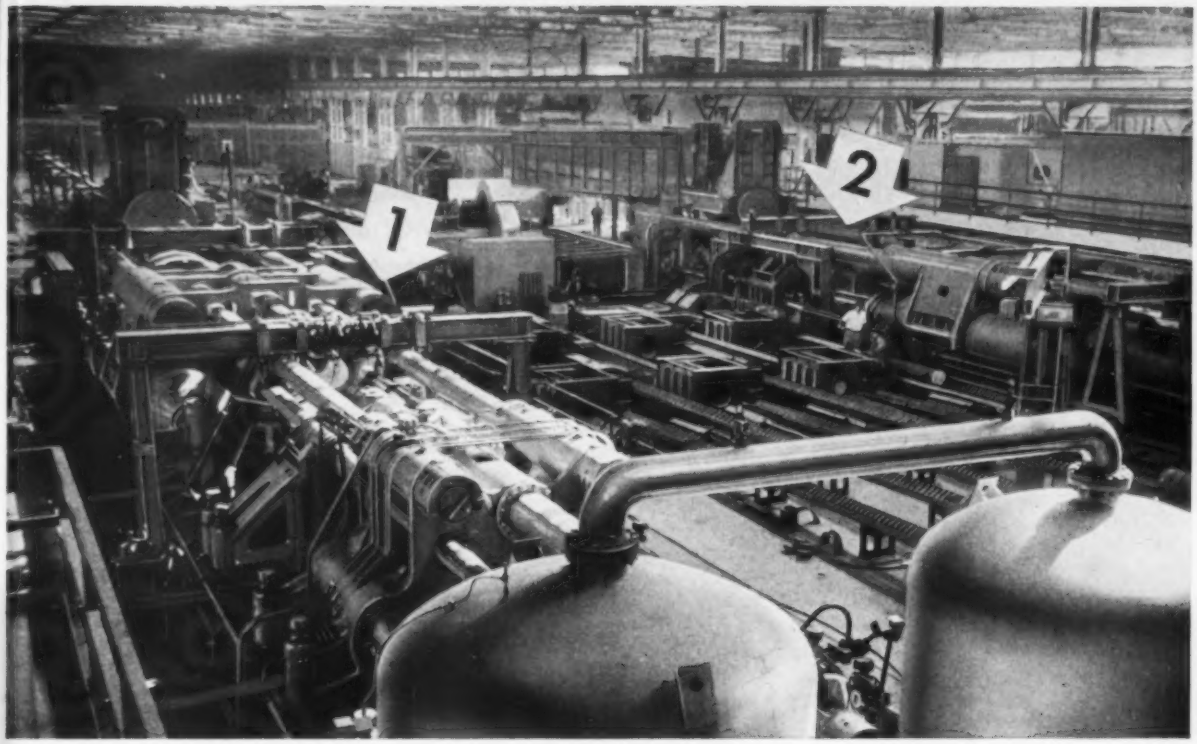
HOSE FITTING



A leakproof, detachable fitting for use with Aeroquip No. 666 Teflon hose has been announced by **Aeroquip Corp.**

Designated "Super Gem," the fitting is available in steel, stainless steel or aluminum and is said to be leakproof even after high temperature aging.

(*Continued on Page 57*)



Our two identical heavy presses protect against production delays

PRODUCTION of heavy extrusions began last month at Kaiser Aluminum's Halethorpe, Maryland plant.

We are the *only* producer of heavy extrusions with duplicate presses—identical in size and capacity.

As a result, regardless of any temporary shutdown of either press, *production can continue without interruption* because dies can be moved from one press to another without modification.

Thus, air frame manufacturers are assured greater protection against delays and disrupted schedules.

Soundest, highest quality extrusions ever made!

Billets produced for these presses are made using revolutionary degassing and metal-working techniques—a Kaiser Aluminum first, offered exclusively by us. Result: a new order of billet quality; virtually free from gas porosity; highest degree of freedom from inclusions.

Each of these heavy presses is capable of producing a finished aluminum extrusion up to 17 inches wide, 85 feet long, and up to 1,200 pounds in weight. In many cases substantially wider extrusions can be produced depending upon section design.

Kaiser Aluminum's new plant is completely equipped with the most modern facilities and fully integrated for the production of heavy extrusions exclusively.

Our engineers have had long experience in extrusion design and application. You are urged to take immediate advantage of their services.

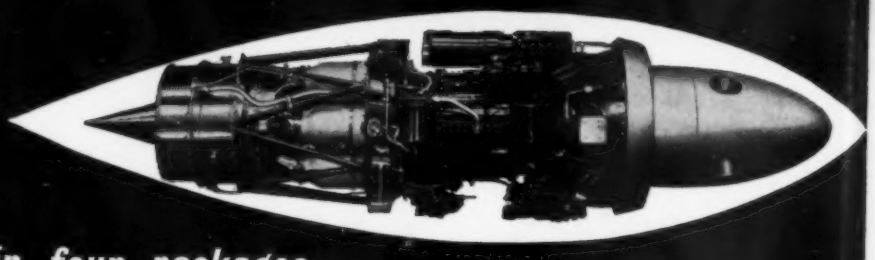
Contact Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office*, Palmolive Bldg., Chicago 11, Illinois; *Executive Office*, Kaiser Bldg., Oakland 12, California.

For details send for brochure, "Kaiser Aluminum Heavy Press Extrusions." Address: 61162 Kaiser Bldg., 1924 Broadway, Oakland 12, California.

Kaiser Aluminum

setting the pace—in growth, quality and service

Circle No. 24 on Reader Service Card.

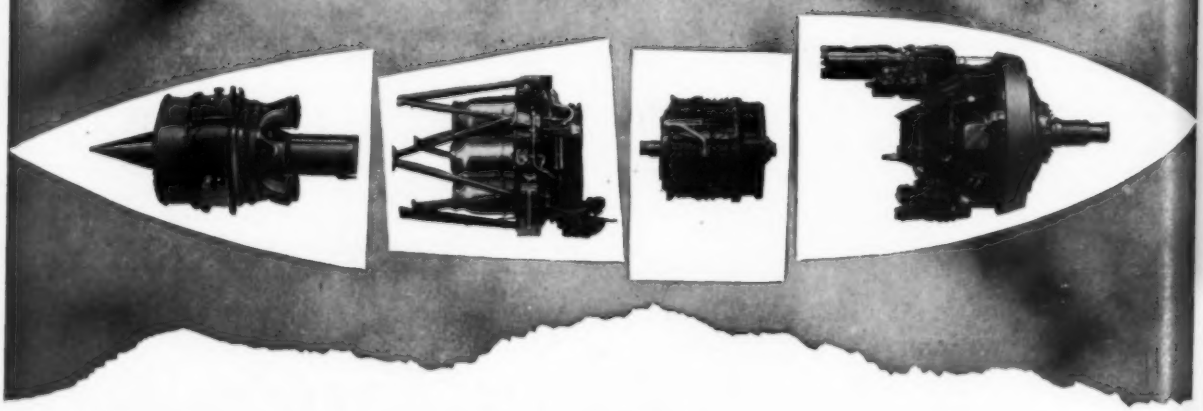


power in four packages

One big advantage of the Napier Eland propeller-turbine is easy maintenance. Eland power comes in four packages — (1) the reduction gear assembly, (2) the compressor assembly, (3) the main support plate and combustion chamber assembly and (4) the turbine unit. Interchangeability of these major components is catered for, thereby ensuring simple and cheap maintenance.

more facts about the Eland

* High aerodynamic efficiency — 3,000 e.h.p. in a maximum diameter of 36 inches.
* Low specific weight — 0.52 lbs./e.h.p.
* Low specific fuel consumption — 0.450 lbs./e.h.p./hr. at 36,000 ft. 400 knots cruising: 0.505 lbs./e.h.p./hr. at 20,000 ft. 350 knots cruising.
* Ease of control — single lever control with manual over-ride, guards against engine overspeeding and overfuelling.
* Automatic temperature compensation.
* At the first attempt the Eland has recently passed a 150 hour type test rehearsal at the full 3,000 e.h.p. rating.



NAPIER **Eland turbo-prop**

Partners in Progress with The ENGLISH ELECTRIC Company Ltd.

D. NAPIER AND SON LIMITED · LONDON. W.3.

CNC 817

NEW PRODUCTS

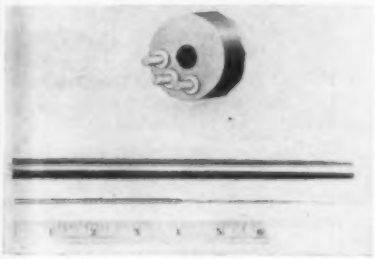
(*Continued from Page* 54)

Unlike conventional swaged or crimped fittings, Super Gem fittings do not hold by compression of the Teflon inner tube. There can be no loss of compression due to the cold flow characteristics of Teflon. Thus the hose assembly with this new fitting is as ageless as the hose.

The fitting consists of a socket, "olive" and nipple. First step in assembly is to slide socket over the hose. Next, the "olive" is pushed by hand into position between the Teflon inner tube and the wire braid. Assembly is completed by screwing the nipple into the socket using an ordinary AN adapter.

Circle No. 155 on Reader Service Card.

LINEAR TRANSDUCER

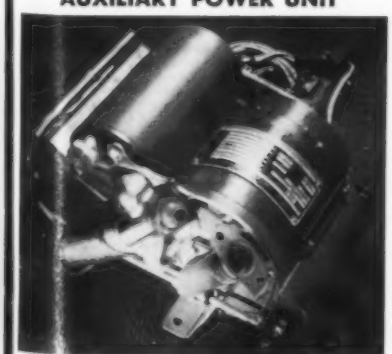


A new miniature linear transducer developed by **Crescent Engineering & Research Co.** senses linear motion, position, displacement and vibration in ovens, hot fluids, radioactive regions etc.

The transducer operates in temperatures from —160° F to 1,300° F without cooling or other protection. The sensing element works as part of an ac bridge circuit and is usable with most types of carrier equipment.

Circle No. 156 on Reader Service Card.

AUXILIARY POWER UNIT



Garrett Corp.'s AiResearch Manufacturing Division has developed a new auxiliary power unit that provides electrical and mechanical or hydraulic power to operate guidance and control systems in guided missiles.

Weighing 29 lbs. and measuring 13 x 10 x 7 in., the unit delivers 650 watts of power and can be up-

PANELOC announces a new rotary latch

Saves Cost • Saves Time
Saves Space • Saves Weight

This new Paneloc Rotary Latch is a simple and economical, strong and durable fastener for access panels, electrical control panels, inspection doors, machinery doors, and other hinged or removable covers. It permits a larger access opening, operates quickly with a quarter-turn. Entire assembly on access panel itself, eliminating many installation steps; no special tools required. Only four simple parts; made of steel, cadmium plated. Three standard sizes now available, more to be added. Special sizes and finishes available on order. Cost very low, performance unsurpassed. Write for a catalog and price list for your file.

PANELOC...America's most versatile line of aircraft fasteners . . . Rotary Latches, Styles 1, 2, and 3 Panel Fasteners, High Performance Fasteners, Snap Fasteners.

PANELOC—A product of Scovill

Scovill Manufacturing Company, Aircraft Fastener Div.
44 Mill Street, Waterbury 20, Connecticut

Please send me fastener catalogs checked:

( ) Rotary Latch ( ) Style 3 (MIL-F-5591A)
( ) Styles 1 & 2 (MIL-F-5591A) ( ) High Performance (NAS-547)
( ) Snap Fasteners (AN 227)

Send to:

Name_____ Title_____

Company_____

Address_____

UNDER WAY

. . . the development of NUCLEAR AIRCRAFT at CONVAIR--Fort Worth

Progress is being made in the Applied Nuclear Field at CONVAIR — Fort Worth — in nuclear analysis, design and experimentation, including the fields of shielding, radiation effects and nuclear aircraft technology.

As an integral part of General Dynamics Corporation's program of pioneering in Nuclear Fields, CONVAIR'S activities afford inviting opportunities for engineers and physicists to enter into Nuclear Development at its most advantageous stage.

CONVAIR'S Nuclear Program offers highly rewarding career opportunities both by way of professional accomplishment and personal income. A company-sponsored, in-plant program enables candidates to earn graduate degrees in Nuclear Engineering.

Fort Worth in the Great Southwest has an abundance of sunshine and dry, fresh air conducive to outdoor living and recreation. Within a few minutes drive of Fort Worth are seven large lakes which provide ample facilities for fishing and other water sports.

For further details write M. L. TAYLOR
CONVAIR Engineering Personnel Dept. UU
Fort Worth, Texas

CONVAIR
FORT WORTH

C O N V A I R
A DIVISION OF GENERAL DYNAMICS CORPORATION
FORT WORTH, TEXAS

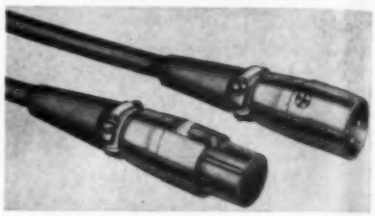
NEW PRODUCTS

rated to 1,600 watts. It performs with either a liquid or solid propellant. When the propellant burns, gas is generated against a turbine wheel mounted on the same shaft as an induction generator rotating at about 24,000 rpm.

An output shaft turned by a pinion gear system will operate missile controls mechanically or turn a pump for hydraulic power up to 2.5 hp.

Circle No. 161 on Reader Service Card.

CORD CONNECTOR



Cannon Electric Co. is producing new XLR audio type cord connectors for aircraft test equipment, instruments, microphones and low-level sound applications.

Plugs and receptacles are shock-proofed to provide quiet connection through the use of insulating material of resilient synthetic rubber. This material (polychloroprene) protects the contacts from dust and moisture.

Circle No. 157 on Reader Service Card.

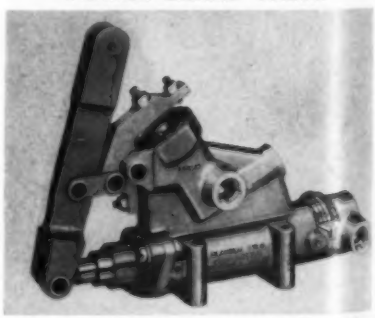
FILTER CARTRIDGE

A fiber glass filter cartridge designed to fit standard filter containers is offered by the **Porous Plastic Filter Co.**

Trade-named Glas-Kleer, these cartridges are made in grades of 2, 10, 25 and 50 microns. The cylinder of the cartridge is lined with fibre glass cloth to insure lint-free filtration. According to the maker, the cartridge was developed to overcome the limitations of wool-felt and cotton-yarn cartridges.

Circle No. 170 on Reader Service Card.

POWER BRAKE VALVE



A combination power brake valve designed to provide the pilot with the advantages of both a power brake valve and a master brake cylinder has been developed by **Gladden Products Corp.**

The unit gives normal braking,

(*Continued on Page 60*)

Another First From Lycoming

SUPERCHARGED PERFORMANCE FOR SMALLER EXECUTIVE AIRCRAFT

Latest Lycoming supercharged engine, GSO-480, will enable executive aircraft to climb higher, give more over-the-weather operation

Now from Lycoming comes the GSO-480, 340-h.p. engine . . . the first geared and supercharged engine in its horsepower class, manufactured and approved in the U. S.

Like its geared and supercharged predecessor, the 400-h.p., 8-cylinder GSO-580, Lycoming's GSO-480 makes possible greater altitude performance, more over-the-weather operation, more payload from high-altitude airports.

Such performance improvement is but one of Lycoming's continuing contributions to aviation progress.
For specific information on how the GSO-480 or GSO-580 can improve present or contemplated aircraft — military or commercial — write to Lycoming, Stratford, Conn.

Lycoming

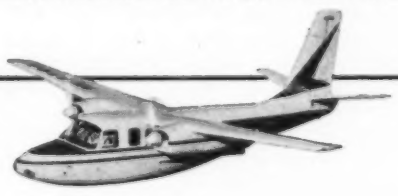
avco MANUFACTURING CORPORATION

DEFENSE AND INDUSTRIAL PRODUCTS

combine the scientific skills, and production facilities of 3 Avco divisions: Lycoming; Avco Advanced Development; Crosley — to produce power plants, electronics, air-frame components, and precision parts.

ADVANCE FOR AERO-COMMANDER

Traditionally fine performance of this executive 6-seater will be improved by its supercharged power plant —the Lycoming GSO-480



Circle No. 25 on Reader Service Card.

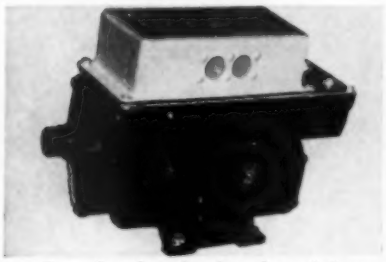
NEW PRODUCTS

(*Continued from Page* 58)

through a power brake valve, where hydraulic system pressure is available. For emergency braking and ground-handling braking, where main system pressure is not available, a master brake cylinder has been incorporated.

Circle No. 159 on Reader Service Card.

POWER UNIT



Lear Inc. has developed a miniature power unit that successfully withstands vibrations of 2,000 cps at 10 Gs. Designated Series 257, the unit provides a remote means of actuation, through flexible drive equipment, for screwjacks, gear boxes and controls.

Company engineers say the improved shock and vibration resistance is a result of the design, which brings about an even distribution of mass throughout the closely coupled housing. A typical unit weights 4 lbs. and measures 2.7 x 5 x 7.5 in. Power supply may be either 26 volts dc; 115 volts, single-phase, 400-cycle ac or 200 volts, three-phase, 400-cycle ac.

Circle No. 160 on Reader Service Card.

'TALKING BEACON'

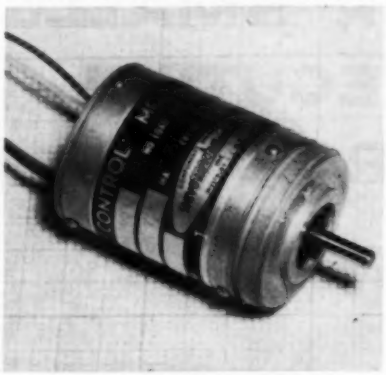
Air Associates, Inc. has developed a VHF aircraft radio navigation aid for pilots that broadcasts a voice bearing. Called a "Talking Beacon," the unit provides spoken bearing information without the need for any special equipment aboard the aircraft other than the usual VHF receiver.

The beacon keeps aircraft on course by broadcasting bearing intelligence in a recorded feminine voice every 20 degrees at intervals of 15 seconds. The pilot merely tunes in the desired or specified beacon station on his VHF receiver.

Broadcasting in a frequency range of 100 to 150 megacycles, the beacon is said to provide effective reception up to 50 miles, barring terrain or other line-of-sight obstructions. It consists of three VHF transmitters and three separate antennas. Transmitters and antennas are fastened to a slowly rotating mast.

Circle No. 162 on Reader Service Card.

400-CYCLE SERVO MOTOR

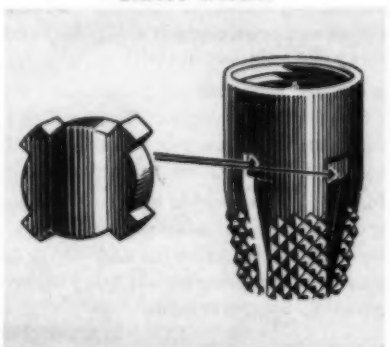


A miniaturized servo motor designed for operation in high ambient temperature applications is offered by **Servomechanisms, Inc.**

Capable of withstanding continuous Class H operating temperatures, this 3-oz. motor, measuring 1 1/16 in. in diameter, is said to have a minimum life of 1,000 hours of continuous operation at 150°C. It operates on 115 volts and has a maximum power output of 0.6 watts.

Circle No. 152 on Reader Service Card.

BRASS INSERT



The Phelps Manufacturing Co. has developed a new-type, self-locking brass insert for manufacturers of molded and machined plastic parts and for use in die castings and softer materials. It is said to eliminate open press time, reduce rejects and speed assembly.

The Dodge expansion insert, as it is trade-named, is designed to be placed by hand or machine-fed into a molded or drilled holes at any time after molding. It consists of a knurled brass shield and a locked-in spreader. The spreader is driven downward, expanding the insert without contact with the threads.

Circle No. 164 on Reader Service Card.

(*Continued on Page* 63)

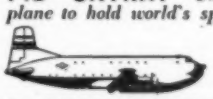
Engineers!

Join this winning team!

At DOUGLAS you'll be associated with top engineers who have designed the key airplanes and missiles on the American scene today. For example:

DC-7 "SEVEN SEAS" *America's finest, fastest airliner*

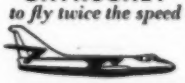
F4D "SKYRAY" *Only carrier plane to hold world's speed record*



C-124 "GLOBEMASTER" *World's largest production transport*

NIKE *Supersonic missile selected to protect our cities*

"SKYROCKET" *First airplane to fly twice the speed of sound*



A3D "SKYWARRIOR" *Largest carrier-based bomber*

A4D "SKYHAWK" *Smallest, lightest atom bomb carrier*

B-66 *Speedy, versatile jet bomber*

With its airplanes bracketing the field from the largest personnel and cargo transports to the smallest combat types, and a broad variety of missiles, Douglas offers the engineer and scientist unequalled job security, and the greatest opportunity for advancement.

For further information relative to employment opportunities at the Santa Monica, El Segundo and Long Beach, California, divisions and the Tulsa, Oklahoma, division, write today to:

DOUGLAS AIRCRAFT COMPANY, Inc.

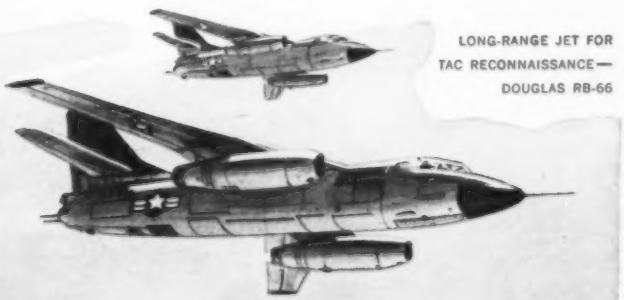
C. C. LaVene, Employment Mgr.
Engineering General Office
3000 Ocean Park Blvd.
Santa Monica, California

Peace Officer
ready for war

This man is a peace officer. His beat is the whole world, for he flies for TAC—the Tactical Air Forces of the U. S. Air Force.

Primary job of the Tactical Air Forces is to stamp out "brush fire" aggressions wherever they may occur. This is being accomplished by maintaining at combat readiness a completely self-contained striking force with a devastating nuclear punch, and a global reach.

Such a far-reaching assignment calls for versatility in men, equipment, techniques and weapons. Douglas is proud to have its planes included in the Tactical Air Command's inventory of fighters, bombers, transports and reconnaissance aircraft.



LONG-RANGE JET FOR TAC RECONNAISSANCE— DOUGLAS RB-66

Defense is everybody's business

The Douglas RB-66 can fly 600-700 mph but not without people to pilot and service it. The Air Force needs young men and women who agree that "defense is everybody's business."

Depend on *DOUGLAS* **First in Aviation**

C-130 HYDRAULICS. SYSTEM ALTITUDE OPERATIONAL TESTS

LONG RANGE EXPANSION PROGRAM REQUIRES QUALIFIED ENGINEERS

Advanced projects in large aircraft categories are creating openings for qualified Engineers in the fields of Design, Research, Laboratories, Structures, Flight Test, Dynamics, Operations Research, Preliminary Design and many others.

Qualified Engineers interested in becoming associated with an Engineering Organization engaged in complex and far-reaching assignments will be supplied with further information. Your inquiry will be held in strictest confidence.

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JIM WADE
ENGINEERING PROFESSIONAL PLACEMENT
LOCKHEED
AIRCRAFT CORPORATION DEPT. AMA-125
761 PEACHTREE N. E., ATLANTA, GEORGIA

NEW PRODUCTS

(*Continued from Page 60*)

CAVITY WAVEMETER

DeMornay-Bonardi is now producing a line of precision cavity wavemeters which serve the range of 2.6 kmc. to 90 kmc. in eleven sizes. Nitrogen-filled, with temperature compensation supplied by a bi-metallic mechanism, the wavemeters have a precision micrometer-type turning screw that resolves plunger travel into 0.0001 inch increments. Micrometer back-lash is said to be eliminated by spring loading. The units are designed for operation from —30°C to 70° C.

Circle No. 165 on Reader Service Card.

VACUUM CAPACITORS

A new vacuum capacitor on the market is offered by **Jennings Radio Mfg. Corp.** The Type JCSF capacitors are 1⅜ in. long and 1⅛ in. in diameter. They are available in capacities of 25, 40, 80, 120 and 150 mmf for peak voltages of 7½ kv, 10 kv and 15 kv.

Of all-copper construction, the capacitors are rated at 30 amperes rms. The current rating can be doubled if forced air cooling is used. For ease of mounting, 8-32 tapped holes are provided on each end of the units.

Circle No. 166 on Reader Service Card.

MAGNETIC TRANSDUCER

Electro Products Laboratories is manufacturing a new Electro Magnetic Pickup, Model 3030, that is intended for slow speed or very low excitation ranges. Output voltage is proportional to the rate of motion of any moving magnetic metal object.

Missile Ready!

Pressurized . . . fully checked . . . in a word, *ready!* This Greer Gas Booster and Missile Checkout Test Unit has charged the system with high pressure gases at 6000 psi, accurately checked pressures of all gases and fuels. It has made a complete, positive Go and No-Go checkout of the electrical system, including power supplies. On many a launching site this self-contained test unit, another product of Greer engineering, insures that costly missiles will come unfailingly to life at the count-down.

Operation Big Lift!

Sure, safe lifting of heavy aircraft calls for this Greer Hydraulic Jack Power Supply Unit which operates up to eight jacks simultaneously under every condition of climate or location . . . from — 65° to + 180° F. . . . sea level to 6000 feet.

Scramble! When time is precious, this self-propelled Greer Pneumatic Starter starts any type jet aircraft engine in about 30 seconds—heats air to 500° F., delivers it at 125 ppm and 55 psig.

GREER
GROUND SUPPORT EQUIPMENT

Write or call for details today!

GREER HYDRAULICS INC. • N. Y. INTERNATIONAL AIRPORT • JAMAICA 30, NEW YORK

Field Offices: 25 S. Main Street, Dayton • 6736 Lankershim Blvd., N. Hollywood

Circle No. 27 on Reader Service Card.

Introducing another NEW B&H Instrument...

TAKCAL

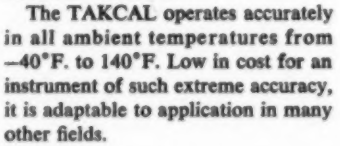
· COMPACT
· LIGHTWEIGHT
· RUGGED

Reads Jet Engine Speed to Guaranteed Accuracy of 10 RPM in 10,000 RPM (±0.1%)

The new B&H TACKAL incorporates a refinement of the frequency meter principle. It operates in the low (0 to 1000 cps) range, reading the frequency of the tachometer generator on a scale calibrated in percent RPM corresponding to the engine's RPM. In addition the TAKCAL checks the tach system. The TAKCAL circuit and tachometer are parallel so that readings can be made simultaneously to determine the accuracy (or inaccuracy) of the aircraft's tach system. The TAKCAL operates during the engine run to properly set up engine controls for maximum economy and safety.

Originally developed as a component part of the J-Model JETCAL ANALYZER, the TAKCAL is now available as a separate unit for use with all earlier models of the JETCAL TESTER.

The TAKCAL operates accurately in all ambient temperatures from —40°F. to 140°F. Low in cost for an instrument of such extreme accuracy, it is adaptable to application in many other fields.



Explosion-proof TAKCAL for special applications. Measures 200 to 7500 RPM, direct reading, with ±0.1% accuracy.

For full information write or wire . . .

TAKCAL

B & H INSTRUMENT Co., Inc.

1009 Norwood • FORT WORTH 7, TEXAS

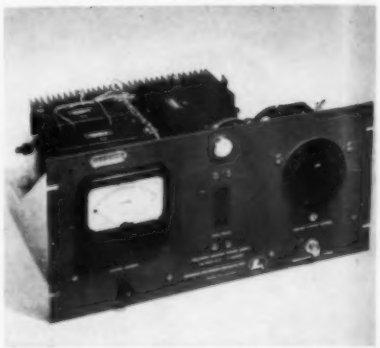
Circle No. 28 on Reader Service Card.

NEW PRODUCTS

Another model, 3010-HTAN, is designed for use at temperatures up to 500°F. Resonant frequency of the transducers is 85-95 kc without the cable, and 15 kc with 10 feet of shielded cable. DC resistance is 1500 ohms ±10%. Impedance is 2,800 ohms at 1,000 cps. Dimensions are 2-1/16 x ¾ ins.

Circle No. 167 on Reader Service Card.

KLYSTRON POWER SUPPLY



Designed for use with high-power klystrons and traveling-wave tube focusing magnets, a power supply variable up to 150 volts at 4 amperes is available from **Levinthal Electronic Products, Inc.** The unit includes an undercurrent relay to interlock with the tube beam supply and indicator light, power switches, and fuses. The assembly is designed to fit a standard 19 inch relay rack.

Circle No. 168 on Reader Service Card.

ROTARY ACTUATOR

Nacelle vent louvres on the Lockheed C-130 transport will be operated by a new rotary actuator designed and manufactured by Air Associates' Aircraft Products Division. Designated the M-7370, the actuator is installed in turboprop power packages being built by Rohr Aircraft Corp. for Lockheed.

Weighing 2.1 lbs., the actuator has an operating torque of 50 in.-lbs. at 2.5 rpm. It is powered by an enclosed 26-volt dc reversible motor. Dimensions are 7 by 3¼ by 2½ in. Rotary action is continuous, the shaft stopping only after the load limit is reached.

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One of the great problems to be overcome in man's conquest of the air, and beyond, is to resolve the conflict between changing design requirements resulting from new configurations of increased performance, and the need for a lightweight, efficient structural design. New materials and structural arrangements must be mated to minimize the effects of aerodynamic heating while keeping in mind that structural considerations are only one important part of making the final design a working system.

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Some of the positions currently open require direct experience in aircraft. However, engineers from related technical fields or men with advanced degrees and less experience may find that they are qualified for these positions and will benefit by investigating the many advantages engineers enjoy at Chance Vought.

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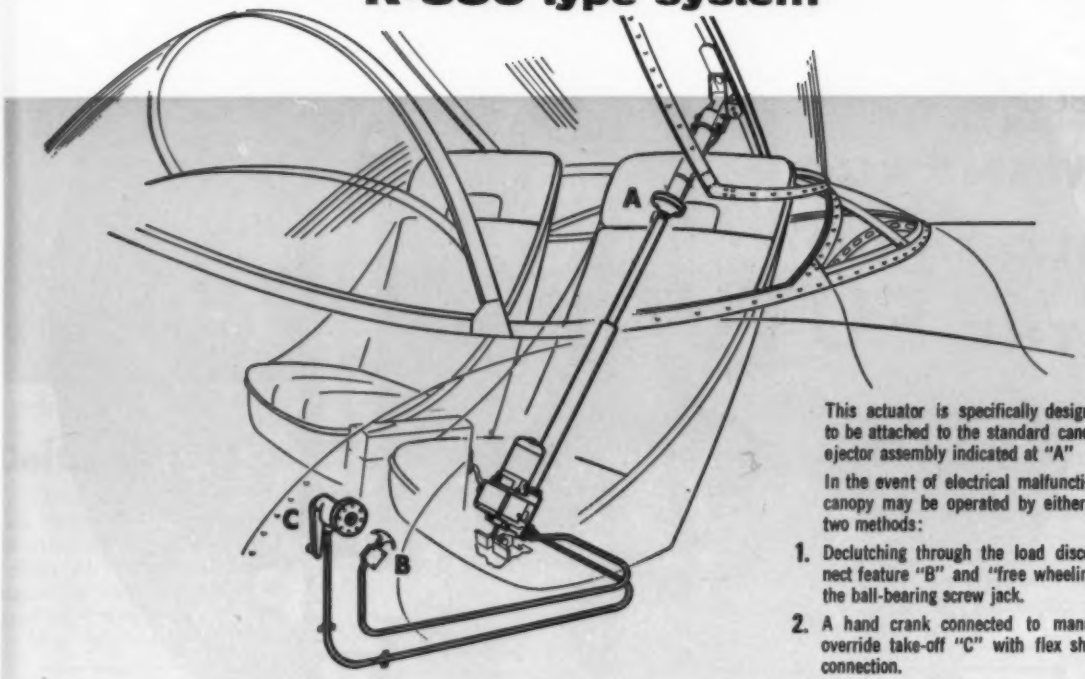
CANOPY OPERATING SYSTEMS

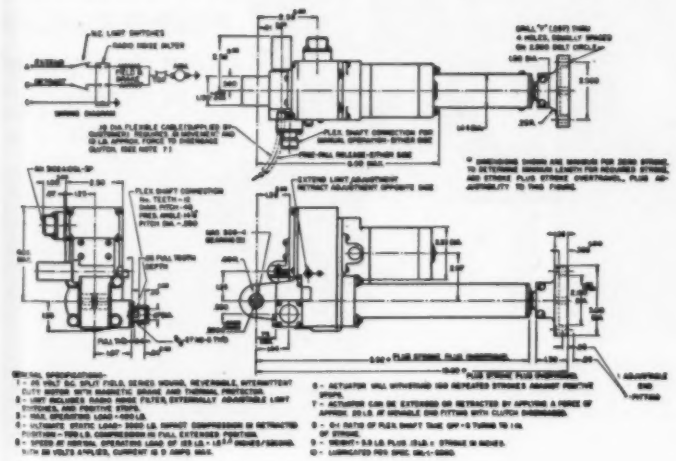
R-550 type system

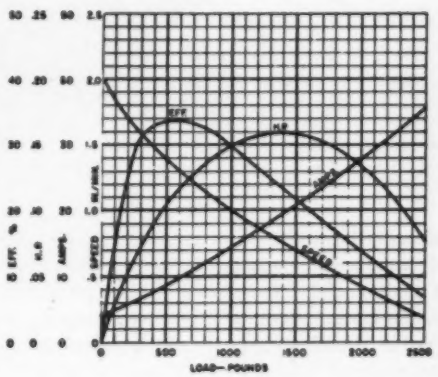


This actuator is specifically designed to be attached to the standard canopy ejector assembly indicated at "A"

In the event of electrical malfunction, canopy may be operated by either of two methods:

1. Declutching through the load disconnect feature "B" and "free wheeling" the ball-bearing screw jack.
2. A hand crank connected to manual override take-off "C" with flex shaft connection.





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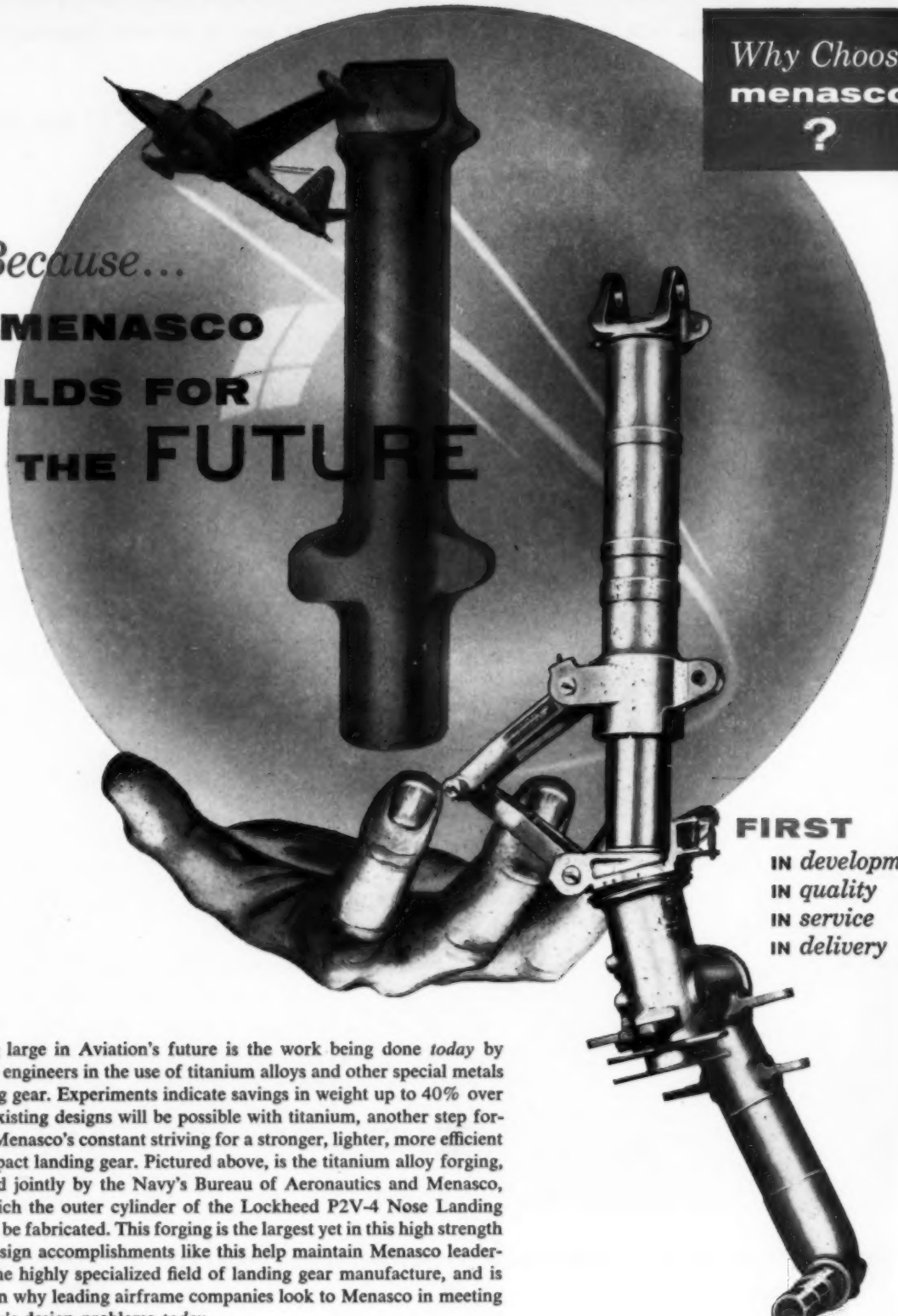

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Looming large in Aviation's future is the work being done *today* by Menasco engineers in the use of titanium alloys and other special metals in landing gear. Experiments indicate savings in weight up to 40% over certain existing designs will be possible with titanium, another step forward in Menasco's constant striving for a stronger, lighter, more efficient and compact landing gear. Pictured above, is the titanium alloy forging, developed jointly by the Navy's Bureau of Aeronautics and Menasco, from which the outer cylinder of the Lockheed P2V-4 Nose Landing Gear will be fabricated. This forging is the largest yet in this high strength alloy. Design accomplishments like this help maintain Menasco leadership in the highly specialized field of landing gear manufacture, and is the reason why leading airframe companies look to Menasco in meeting *tomorrow's* design problems *today*.

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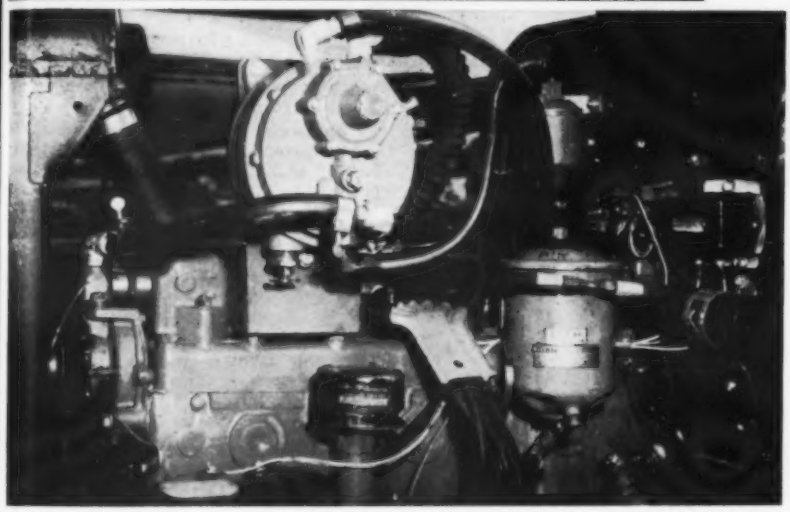
Maintenance Bulletin Board



Liquefied petroleum installation on Delta Air Lines' ground equipment at Atlanta Airport.

Delta Cuts Costs with LP Gas

Delta Air Lines operating officials look forward to major savings in the operation of automotive equipment at Atlanta Airport as the result of a conversion of this equipment to use of liquefied petroleum gas.

Not only do they anticipate a direct reduction of more than nine cents a gallon in fuel costs, but also reduced fuel consumption, longer engine life and less maintenance.

H. A. Petty, assistant to DAL's maintenance superintendent, estimates this will all add up to a yearly saving of $319.98 per vehicle—$286.08 in fuel costs, $5.28 in lower engine oil consumption and $28.62 from longer engine life.

At this rate Delta will amortize the $150 cost of converting tugs and ground power units to LP gas in less than six months of operation.

Decision to adopt LP gas results from a five-month test conducted by Delta's maintenance department and General Gas Corp. of Baton Rouge. This experiment showed lower fuel consumption and elimination of spark plug fouling, while gaining the benefit of improved performance from the higher (100-octane) rating from the liquefied petroleum gas.

New Oil Screen Cleaner

Trans World Airlines, now in the final stages of planning its new multi-million dollar Kansas City overhaul base, has turned to the old-fashioned household washing machine as the best method for cleaning aircraft engine oil screens.

TWA finds that by agitating dirty screens in a decarbonizing solution in the washer they can be cleaned in 45 minutes. The job formerly took one to two weeks in a complicated engine parts cleaner.

Bucking Bar Eases Riveting Strain

A new spring-loaded bucking bar devised at The Glenn L. Martin Co. is designed to take the strain out of difficult riveting jobs.

The new bar is used for riveting unusually thick sections where sheets normally would be clamped together before riveting.

Another use is where heat-treated or heavy metal rivets are used, or when thin skins or brittle metals such as titanium are likely to be scarred by heavy hammering.

Main feature of the new tool, Martin technicians feel, is that it takes the strain off the operator, reduces fatigue and minimizes errors.

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People

MANUFACTURING

Harold H. McIntosh placed in charge of missile projects, Goodyear Aircraft Corp.

Ernest G. Stout, after 19 years with Convair, resigns to become asst. mgr. of business development for Ralph M. Parsons Co. of Los Angeles.

McIntosh

Stout

Bliss K. Thorne appointed public relations director of AVCO Mfg. Corp.'s advanced development division.

Charles R. Strang named asst. chief engineer and chief designer of Tulsa division, Douglas Aircraft Co.; **W. H. Hough** made contract administrator for El Segundo division; **O. E. Bottorff** appointed asst. to Arthur E. Raymond, vp-engineering.

Elwood R. Quesada resigned as vp and director of Lockheed Aircraft Corp. and gen. mgr. of its missile system division.

Donald R. Spotz named gen. sales mgr. and **Robert L. Schroeder** named aircraft sales mgr., Pesco Products Division of Borg-Warner Corp.; **H. Charles Yaeger** appointed mgr. of manufacturing.

Nils Lou named works manager and **Irving Keough** made factory manager of Republic Aviation Corp.

Raymond E. Jacobson appointed mgr. of component and instrument sales, Electronics Division, Curtiss-Wright Corp.

Thomas Linder, Jr., became manufacturing mgr. of Chandler-Evans.

Gerard Q. Decker named mgr. of eastern division, Servomechanisms, Inc.

Charles T. Roelke appointed executive asst. to gen. mgr. of Pratt & Whitney Aircraft.

Wayne G. English appointed treasurer of Aeroquip Corp.

Donald C. Duncan made gen. mgr. of Berkeley Division, Beckman Instruments, Inc.

Maj. Gen. Alden R. Crawford (USAF, ret.) elected vice president for operations in Europe, Republic Aviation Corp.

R. M. Russell appointed manager of new Hughes Products Division of Hughes Aircraft Co.

Dr. W. L. Barrow named vp for research and development, and **George A. Richroath** named vp for manufacturing, Sperry Gyroscope Co.; **Dr. L. L. Wheeler** made chief engineer and **Samuel Agabian,** works manager.

Lee S. Johnson promoted to senior asst. gen. mgr. of Sikorsky Aircraft Division, United Aircraft Corp.

William C. Keller appointed mgr. of customer relations of Convair-San Diego.

A. J. (Al) Lilly promoted to mgr. of aircraft sales for Canadiar Limited, Montreal; **Richard M. Wilson** to asst. to Lilly.

AIRLINE

Richard S. Mitchell elected vp guided missiles range division, Pan American World Airways.

Robert L. Griffith appointed asst. to the president in charge of new executive office, Delta Air Lines, Washington, D.C.

Ken Smith named director of public relations, Western Airlines, Inc.

Erik de Cavalho made asst. to the president of VARIG with headquarters in Rio de Janeiro.

James J. Kerrigan appointed traffic co-ordinator for Riddle Airlines.

Capt. William S. Magill promoted to vp-operations, Southern Airways, Inc.

Bruce C. McLean named legal counsel and asst. secy. of Mohawk Airlines.

George S. Sztybel appointed cargo development mgr. for KLM Royal Dutch Airlines in the U.S.

Jack W. Seay named director of ground operations for Braniff International Airways.

Arthur J. Fallon made chief of air terminal properties division, aviation department, Port of New York Authority.

Theodore P. Gould appointed American Airlines district sales mgr. for the Pacific area, headquarters Honolulu; **Thomas J. Harris** named director of cargo sales for American Airlines.

John Farrow appointed U.S. traffic and sales mgr. for Aerovias Panama Airways.

Hugh B. Main named exec. asst. to the president, Canadian Pacific Airlines; **H. B. Renwick** replaces Main as gen. traffic and sales mgr.

MILITARY

Brig. Gen. Victor Haugen, USAF, named Wright Air Development Center's deputy commander for development.

Grayson A. Tucker appointed Deputy Asst. Secy. of Defense.

HONORED

Recipients of awards made at the American Rocket Society's annual Honors Night dinner were: **Lt. Col. E. N. Hall,** Western Development Div. Hq., AR&D Command, Ingleside, Calif., the Robert L. Goddard Memorial Award for contribution to liquid propellant rockets; **Wernher von Braun,** Guided Missile Development Div., Redstone Arsenal, Huntsville, Ala., the ARS Astronautics Award for contribution to the advancement toward space flight; **F. S. Miller,** asst. works mgr., Solid Rocket Plant, Aerojet General Corp., Sacramento, Calif., the C. N. Hickman Award for contribution to solid propellant development; **Walter R. Dornberger,** missile design consultant, Bell Aircraft Corp., Buffalo, N.Y., the G. Edward Pendray Award for literary contribution to jet propulsion; and **Col. John P. Stapp,** chief Aeromedical Field Lab., Holloman Air Development Center, Holloman AFB, N.M., the James H. Syld Memorial Award for outstanding application of rocket power.

Sam Freeman was elected president of National Aviation Trades Assn. for 1956.

West Coast Talk . . . By Fred S. Hunter

- **Douglas considering British Conway bypass.**
- **General Electric may build commercial jets.**

COST-CONSCIOUS Douglas is taking a good long look at the British Conway bypass engine as a prospective power plant for the DC-8. The Conway at 13,000 pounds may not quite come up to the thrust of derated P&W J75, but it's lighter and has better specifics. It also is understood Rolls Royce has expressed a willingness to go along on a guarantee on parts costs, a policy that meets with general airline approval. The engine might very well appeal to U.S. buyers and, of course, the sales advantage of a British engine in the soft currency countries is obvious, especially when power plant prices run up to a million dollars an airplane.

Hunter

* *

George Otis, former v.p. and general manager of Learcal, is now president of Transvale Engineering Corp., new company in the airborne electronics field . . . A. W. Ables recently was upped to director of commercial sales by Convair . . . Dave Callahan sets forth for Australia and New Zealand January 15 to be sure Gilfillan's new Quadradars purchased for the military in the former country and for civil airports in the latter are properly introduced in that part of the world . . . Les Hoffman, president of Hoffman Electronics, says things keep developing so rapidly in the electronics business a man just can't lie fast enough to keep up with the truth.

* *

Douglas C-133 is strictly a logistics airplane, designed for MATS, but some interest has been displayed in a possible advanced version for a troop carrier, in which the P&W T34 turboprops might be replaced by bigger engines, possibly Allison T54s . . . New Douglas contract on the 100,000-pound payload C-132, which has been in the early stages of design (Phase 1) at the Santa Monica division for more than three years, is a Phase 2 order for construction of two prototypes at Tulsa. If there's a production contract, it would also be at Tulsa. This, of course, is dispersal—but the plane is too big for Douglas to build at Santa Monica anyway.

Story is around that General Electric is laying plans to develop a line of commercial engines, both turbojet and turboprop, and has been talking to aircraft manufacturers about their future transport needs . . . Lockheed's Missile System division already has 23 permanent employes at Cape Canaversal, Fla. . . . Both Hughes and National Arcraft's Marvelco division are setting up for west coast production of silicon transistors . . . Electro Circuits in Pasadena, which recently turned out a big ultrasonic tester for aluminum plate for Kaiser Aluminum, is now designing a similar device for the Air Force to test J47 engine compressors.

* *

Three-way race between Aeroproducts, Curtiss and Hamilton Standard to supply the propeller for the Lockheed Electra was about like a photo finish in a horse race. Curtiss looked like a sure winner at the wire, but when American and Eastern produced the "photo," lo and behold, Aeroproducts was the winner by a nose. This is the same propeller, incidentally, that's contributing to the good power job Allison's T56s are reported doing in the Convair YC-131Cs currently being service tested by MATS.

* *

Meat of Western Air Lines' newly awarded Denver-San Francisco route will be the Salt Lake City-San Francisco segment. Travel between Salt Lake and San Francisco is about twice that between Salt Lake and Los Angeles, and latter is one of WAL's better routes. Like everyone else, WAL will be pinched for equipment to start service. WAL has 13 Douglas DC-6Bs on order, but only six of these are scheduled for 1956 delivery and the first of these isn't due until May.

* *

Believe it or not, there are still about 50 Seabees flying in Seattle. Including Ken Gordon's, it might be added . . . Ballplayer Duke Snider says the major leagues will extend to the Pacific Coast (Los Angeles-San Francisco) when jet transports are placed in service. Sounds logical.

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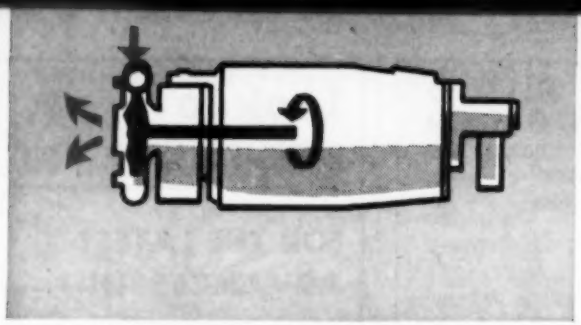
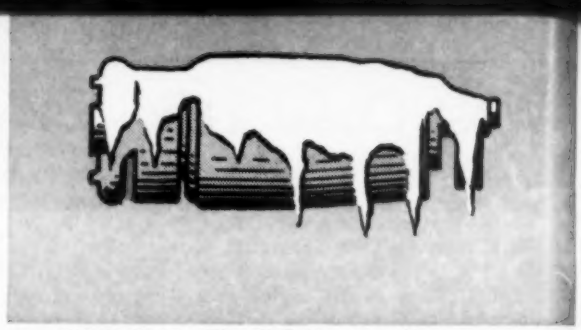
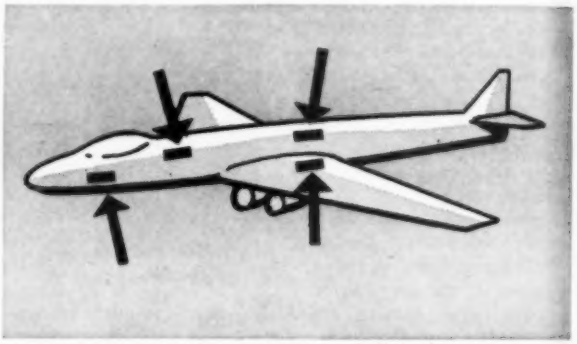


1. RELIABILITY: **Fewer moving parts help assure more dependable operation.**



2. FLEXIBILITY: **The G-E Pump will operate up to 55,000 ft. altitudes.**

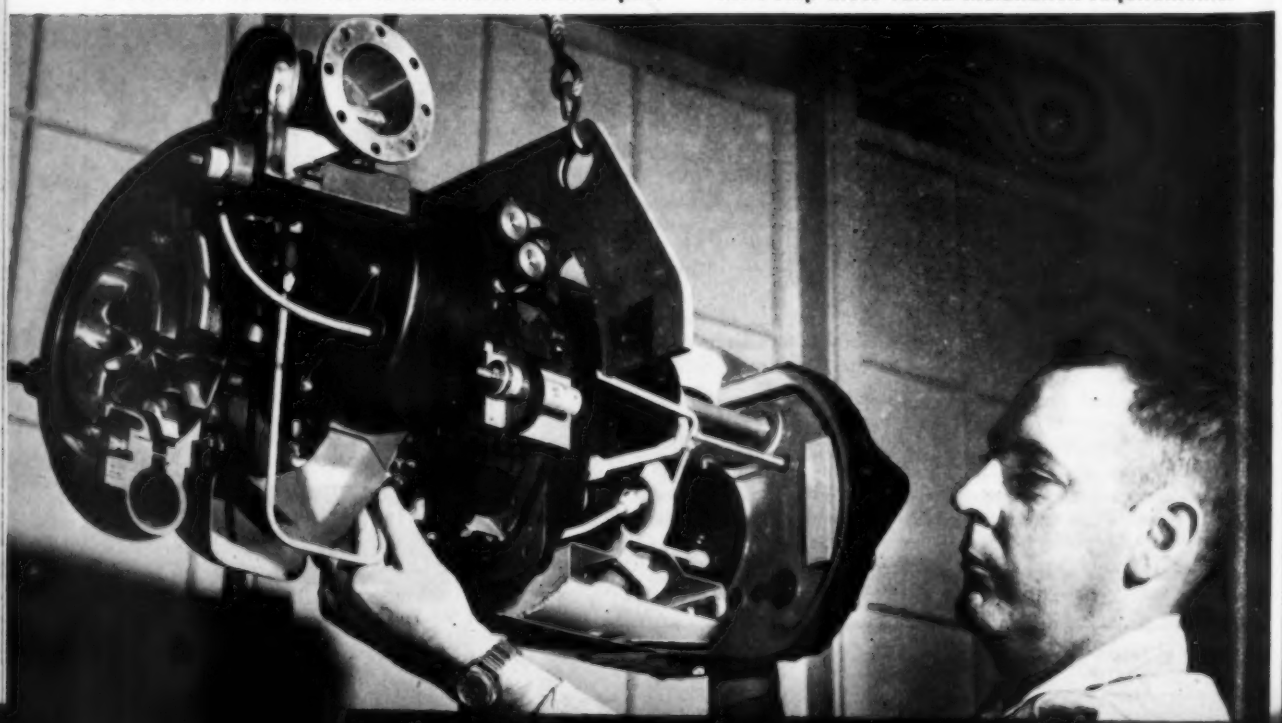
5. NO PAD SPACE NEEDED: **Reduced engine frontal area permits smaller nacelle size.**



6. FUNCTIONAL LOCATION: **G-E turbopumps can be located close to power requirement.**

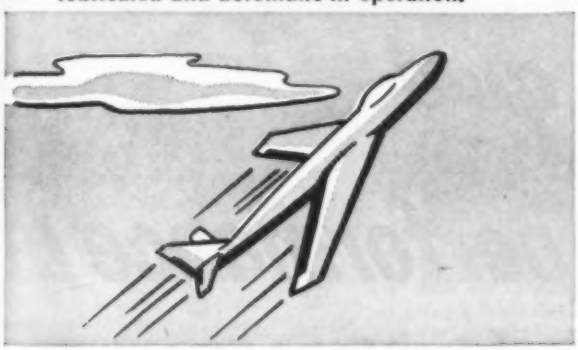
8 ways G-E Hydraulic give your aircraft greater

The G-E Pump is a completely self contained unit with its own control system and integral hydraulic reservoir. The inlet duct is assembled in three positions to permit air supply from three directions relative to a fixed reservoir position. This feature helps the Pump meet varied installation requirements.



3. AUTOMATIC: **Completely self contained, self lubricated and automatic in operation.**

4. EASIER MAINTENANCE: **Equipment changes can be made without removing the main engine.**



7. IMPROVED AIRCRAFT PERFORMANCE: **System's light weight increases speed, climb rate, range.**

8. PROVEN BY QUALIFICATION TESTING: **Can meet requirements of your aircraft.**

Turbopumps can help availability, better performance

General Electric's new Hydraulic Turbopumps are now available to give you the eight benefits illustrated above in furnishing auxiliary power for your aircraft. Designed to operate at almost any location within the plane's structure, the G-E Pump can be used to supply power for such hydraulic requirements as raising and lowering the landing gear, steering, opening and closing bomb-bay doors, maneuvering wing spoilers, and empennage surfaces.

Designed for efficiency—These G-E Pumps operate on the simplest of principles. Turbine wheels in each unit spin on streams of air extracted from the jet engines. The turbine wheel shafts then drive the constant speed variable displacement hydraulic pumps. This system eliminates the problems of bulk associated with direct drive systems. Expensive maintenance procedures are also unnecessary because a mechanic can easily get to each drive inside the plane. Their remote locations eliminate the weight of long transmission lines, and ground test operation is possible without operating the main engines.

Greater aircraft availability: G.E.'s Hydraulic Turbopumps have been proven in operational testing. It has been designed for faster, easier installation, and greater accessibility in maintenance. These inherent features add up to greater availability for your aircraft.

Can meet your requirements—Designed to meet the toughest conditions that might be encountered in flight today, current models can operate up to 55,000 feet. Potential operational altitude is almost limitless. For more information on how General Electric can help you meet your auxiliary power demands, see your nearest G-E Apparatus Sales representative, or write for bulletin GEA-6333. General Electric Company, Section 231-4, Schenectady 5, N. Y.

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International Aviation

By Anthony Vandyk

The jet transport is going to be big business for the oil companies. The Boeing 707 and Douglas will consume about 2,000 gallons of turbine fuel an hour. By comparison, the DC-7 uses about 450 to 500 gallons of avgas hourly.) With a utilization of 3,000 hours per year, this represents a total annual fuel consumption per aircraft of 6 million gallons, a sizable quantity by any yardstick.

Last year the airlines of the free world used about 2,100 million gallons of avgas to keep their 4,765 aircraft in the air. The DC-3 and the DC-6 series (DC-6, DC-6A and DC-6B) tied for top place in the amount of fuel used: the 1,700 DC-3s consumed 420 million gallons while the 367 aircraft of the DC-6 series used the same quantity.

Next greatest beneficiary to the oil companies was the DC-4; the 500 in service in 1954 burned 315 million gallons. The 200 Constellations used a total of 231 million gallons while the 90 Super Constellations consumed 113 million gallons. The 260 Convair 240 and 340 aircraft accounted for 143 million gallons and the 100 Martin 2-0-2 and 4-0-4 models for 55 million gallons.

The individual aircraft that is heaviest on fuel consumption is the Stratocruiser—51 used 88 million gallons in 1954. The 50 DC-7s consumed 63 million gallons.

While the consumption of fuel is bound to go up considerably in the jet age, the amount of oil used will probably be substantially less than it is at present. Indicative of this probability is the disclosure that each Dart engine in Viscounts in airline service has shown an in-flight consumption of 0.08 pints per hour.

On the other hand, the turbine transport is heavy on water-methanol. The 707 and DC-8 will probably need to use 200 or 300 gallons for each take-off. This means that they will have to carry around a lot of water-methanol in addition to very large quantities of turbine fuel (the intercontinental version of the DC-8 will have a fuel capacity of 18,600 gallons).

As postscript to this fuelish subject (the pun is irresistible, but not original), it is interesting to note that at present over 90% of the avgas used by the world's airlines is manufactured in the United States and the Caribbean area. High-octane avgas can only be manufactured economically at large refineries having alkylation facilities, and equipment of this type has been installed at less than half a dozen refineries outside the western hemisphere.

Viscounts Readied for Capital Airlines

Viscounts for Capital Airlines occupy one of the production lines at Vickers-Armstrongs' Hurn, England plant. Five have been delivered and the remaining 55 will be handed over to Capital at the rate of about three monthly.

British Out of Jet Race

In Britain it has been officially announced that the Vickers 1000 is being abandoned, which means that the British industry is out of the running in the long-haul jet transport race. The Ministry of Supply explained that in the course of development the Vickers 1000's weight outstripped the capacity of the powerplant (four Rolls-Royce Conway by-pass jet engines).

G. R. Edwards, head of Vickers-Armstrongs aircraft company, described the abandonment of the aircraft as "a national decision that we shall regret for years to come." In place of the Vickers 1000, RAF Transport Command is to be equipped with Britannia 250LR turboprop transports.

KLM Buys Eight DC-8s

KLM Royal Dutch Airlines has become the first foreign airline to buy American jet transports. It has ordered eight Douglas DC-8s for delivery starting in March 1960. Meanwhile, Air France has ordered 12 SNCA du Sud-Est Caravelle twin-jet transports for delivery starting in 1958. This model is likely to be ordered shortly by French independent UAT-Aeromaritime.

Russian Line Flying Jets

In the Soviet Union jet aircraft are already operating on Aeroflot's route. Converted military Ilyushin Il-28s are carrying mail and newspaper mats while a passenger-carrying model, the Tupolev Tu 104, is likely to enter scheduled service in February or March 1956. Both the Il-28 and the Tu 104 are twin-engine. The latter's speed is 500 mph, its cruising altitude is about 39,000 ft.

Transport Briefs

Air Ceylon, in which KLM now has a minority holding, plans to start service to Europe in February using Lockheed L-749 Constellations . . . **Aero O/Y**, Finnish carrier, plans to start service between Helsinki and Moscow next month with Convair 340 equipment.

Manufacturing Briefs

Britain's next production fighter will be the **Saunders Roe SR 53** which uses rocket-plus-jet power . . . **Short Bros. & Harland** is building a VTO aircraft designated PD 11 . . . The **English Electric** P1 and the **Fairey** Delta can climb at supersonic speed . . . **Svenska Flygmotor** has completed its first license-built Rolls-Royce Avon for use in production Saab-32 Lansen fighters . . . **Fouga** has licensed **Messerschmitt** to build the Fouga 170R Magister jet trainer . . . **Fiat** has received a Bristol Orpheus for installation in the G.82 lightweight fighter.

SNCA du Nord is equipping a Nord 2501 Noratlas transport with **P&W** R2800CB17 engines instead of the standard Bristol Hercules units . . . **Salmson**, French engine company, will cease operations at the end of the year . . . **SNCA du Sud-Ouest** has produced about a dozen Djinn helicopters to date; it is building 120 to meet firm orders and anticipated demand . . . **Vickers-Supermarine** will complete the first N.113 twin-jet fighter this year; a pre-production line has been started.

Pan American World Airways is distributing a new, readable direct-mail piece on advantages of using Clipper Cargo . . . . **Northwest Airlines** has printed red-and-blue folder promoting **NWA-West Coast Airlines** interline service . . .

Safety is Aviation's Biggest Job, Lee Tells NATA Convention

By LOIS C. PHILMUS

PHOENIX, ARIZ.—Need for increased safety was stressed throughout the 16th annual convention of the National Aviation Trades Association here recently. CAA Administrator Fred B. Lee summarized the thinking at the banquet by calling safety "the biggest job ahead" which "can only be accomplished by government and industry working together."

"If we raise the level of safety, we will gain wider acceptance of flying," he pointed out, "which means more dollars in the industry's pockets."

Earlier in the session, George Wietz, deputy director of general aviation, urged NATA members to provide more safety for the dollar. "Those in the maintenance business, who study aviation statistics usually feel a little glow of satisfaction when the record shows that most of the accidents are caused by the human element . . . for maintenance has contributed only a fraction of 1% of the total number of accidents recorded," he said.

"Unfortunately," Wietz added, "the record does not show how many times engines quit on takeoff where the pilot made it back, nor do they show the number of times the pilot limped home with a bad engine because somebody forgot to tighten the spark plug . . . With ever-increasing aircraft performance and the natural urge to 'go places' in these new aircraft, a maintenance failure may be terribly unforgiving."

He recommended that manufacturers, while "giving plenty of safety value for the dollar," could make improvements by way of more service-testing of aircraft and components before introducing them to the public in large numbers. He also suggested that manufacturers "take another look" at their service information policies, on the grounds that safety information "should be nobody's secret."

Wietz urged that industry "take the initiative" in establishing clinics for mechanics in which CAA would participate. He asked for assistance in establishing some standard safety practices. Through the newly-formed National Aviation Maintenance Council, an industry code for product responsibility could be established, he said.

He concluded that a conservative estimate found that $377 million was being spent annually on general aviation maintenance, with every indication "that this figure is low, and in the next five years will almost double.

Other major areas highlighted at the meeting were:

• **Training.** John T. Griffin, vice president for training, said it was "useless to press for hearings on a civil airman training bill" until the Air Force gives assurance that it won't give such a bill "the kiss of death." He cited a bill (HR-7800) introduced by Representative Percy Priest (D-Tenn.) as "potentially a good piece of legislation," but added that hearings "will be useless unless the Air Force agrees that the plan is desirable."

The ROTC bill passed by the House at the end of the last session may have trouble in the Senate, an Air Force representative revealed. "It's passage will not be cut and dried," he warned, because certain staff members of the Senate Armed Services Committee do not like the legislation and "will need strong convincing."

If it is finally passed, the Air Force official said, it must be made to work in its four-year trial period. It must (1) be run as a safe program and (2) reduce considerably the present attrition rate, which runs to 25% for ROTC cadets in primary training. It must also motivate more college sophomores to sign up in ROTC; screen out at the least expense those unqualified to be pilots; and (3) motivate more boys toward an Air Force career.

He also confirmed rumors that the civilian schools would receive around $400 per student for the 35-hour flight course.

• **Airports.** Glenn Degner, NATA vice president for airports, reported that there has been "substantial improvement in long-term leasing practices" by municipalities since 1953. He has found a growing acknowledgement that service operators must have long-lease tenures in order to make large capital investments.

• **Air Taxi.** Membership in the National Air Taxi Conference rose from 88 to 107 in the past year, outgoing president Guy Miller stated. Mileage covered in air taxi increased by 50%. Air taxi operators were asked to participate in comments on proposed revisions to CAR Part 47 which intends to require all pilots flying passengers for hire to have instrument ratings or be restricted to VFR, daylight operations.

New Officers. Sam Freeman of New Jersey was elected NATA president, succeeding Oscar Hostetter. Eastern vice president is David Finger of New York and Western vice president Galen Bertram of Kansas. John Bennett of Kentucky is treasurer.

Cessna 172 Has Tricycle Landing Gear

Cessna Aircraft Co. last month introduced the Model 172, a new four-place single-engine aircraft that features tricycle landing gear. The new gear, called "Land-O-Matic," provides a low center of gravity. Steerable nose wheel is stationary in the air.

The new plane is priced at $8,750 FAF Wichita.

Powered by the six-cylinder Continental 145 hp engine, it has a cruise speed of over 120 mph and a top speed of 135 mph. Range is four and a half hours; gross weight, 2,200 lbs; service ceiling, 14,300 ft.; rate of climb, 660 ft./min.; and fuel capacity, 42 gal. Wing span is 36 ft.; length, 25 ft.; height, 8 ft. 6 in.; wing area, 175 sq. ft. Luggage compartment holds 120 lbs.

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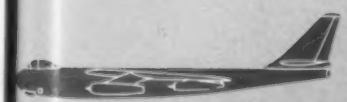

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The responsibility has been fulfilled. Canada's Royal Canadian Air Force has been equipped with the Avro CF-100 in multi-squadron strength. Improvements and refinements maintain its rating as one of the most effective interceptors of this type in the world. And in 1956, CF-100's will start augmenting RCAF NATO squadrons in Europe.

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TRANSPORT TRENDS Washington, D. C., Dec. 5, 1955

AIRLINES HAVE BY NO MEANS seen the end of Civil Aeronautics Board awards granting additional domestic competition. Although CAB has completed three major route cases and will soon bring the fourth (New York-Florida Case) to an early close, it has not shut the door on new bids by carriers.

Board feels diversion of traffic is no longer a compelling reason for limiting competition and intends to continue scanning good traffic markets for potential new services. Next big area case involves proposed services between the Great Lakes area and Florida.

BOX-SCORE ON MAJOR DOMESTIC ROUTE AWARDS thus far finds six regional trunks (Western, Continental, Braniff, Delta, Capital and Northwest) have benefited under CAB's "strengthening" theory. Three of the Big Four (AA, TWA and United) have received major "offsetting" route awards, and Eastern had several certificate restrictions lifted.

National is the only unsubsidized trunk carrier not included in new awards. Of remaining trunks, Northeast hopes for approval of New York-Miami proposal and Colonial looks for approval of a merger deal with Eastern.

SPECULATION OVER CAB CHAIRMAN Ross Rizley getting a federal judgeship in the immediate future has been put to rest. President Eisenhower, in an obvious affirmation of Rizley's leadership, has designated him to head the Board in 1956.

Democrat Joseph P. Adams will be continued as Vice-Chairman. Thus, the only Board membership currently at stake is that of Josh Lee, whose term expires Dec. 31.

LOOK FOR COURT ACTION on CAB's decision in the Large Irregular Air Carrier Investigation. Mounting challenges of the Board's power to authorize route-type services by exemptions makes litigation almost a certainty.

Nor can Congress be expected to pass over such a far-reaching grant without comment. Although no specific action will come until the 84th Congress reconvenes next month, extreme interest has already been evidenced in several quarters.

FIRST SERIOUS TEST of the competitive aspects of Capital Airlines' Viscounts will come in January when the carrier introduces the turboprop in the leading medium—haul airline market—New York-to-Chicago nonstop. Traffic on this segment is about five times that of Washington-Chicago, only major Viscount operation to date, and present competition among four large carriers is the stiffest to be found.

Scope of this competition is evident in recent statistics which show that—before Capital's entry on the scene—American, United, TWA and Northwest have been scheduling 97 N.Y.-Chicago nonstops daily. Total seats eastbound number 3,039, westbound 3,238.

Prelude to Capital's nonstop entry into the battle was its inauguration last week of one-stop service on the route via Pittsburgh. Coinciding with the start of British Overseas Airways Corp.'s Viscount service to Bermuda, it raised to three the number of carriers flying the British turboprop into New York.

CAB's Whitewash of Non-Sked Operators Imperils Structure of Airline System

By WILLIAM V. HENZEY

The Civil Aeronautics Board is headed for the most troublesome period in its brief but stormy history. The Civil Aeronautics Act, the very foundation of our entire airline system, could become a worthless piece of legislation in a few short months.

This is the ominous situation that prevails in the wake of CAB's 3-2 decision in the Large Irregular Air Carrier Investigation (AMERICAN AVIATION, Nov. 21).

Later this month, the Board must decide whether to stand by its decision or, upon reconsideration, to alter, amend or veto it outright.

Blanket Endorsement

• **The ruling,** coming after four years of formal proceedings (which still aren't complete) and about eight years of widespread non-scheduled airline operations, amounted to a blanket endorsement of such operations and an unparalleled grant of authority for the future.

For a good number of the 49 non-skeds in the case, the endorsement can't easily be challenged. But the group among the 49 that ignored the Act and the CAB itself all these years were included in last month's endorsement; in fact, responsible for it.

The situation confronting air transportation as a result does not turn on whether non-scheduled lines have a right to a place in U.S. aviation. Nor does it turn on what financial harm may befall the certificated industry although only time will provide that answer.

The real problems now created are:

• **Will CAB's whitewash** of the entire non-sked industry, its condonation of flagrant violations, breed such contempt for the Act that violations will not only become commonplace, but a necessity for competitive survival?

• **Are certificates** of convenience and necessity now worthless or, at least, outmoded?

• **Is the procedure** for gaining a certificate, in effect for 17 years, now ditched entirely?

The controversial decision was dated Nov. 15. Petitions for reconsideration must be filed by Dec. 15. Usually, an additional 10 days are granted for replies to those petitions. Because the CAB is anxious to dispose of all such petitions before the end of the year (when CAB memberships will be juggled), the agency's final answer will be known before the first of the year.

On January 1, 1956, the order is slated to become effective. Because there are elements of questionable legality involved, the entire matter could well wind up in the Federal courts before that date.

If the decision stands, the CAB might be hard-pressed to prosecute any of the scheduled industry which decided to fly over competitors' routes. If it stands, the present certificates of many, particularly newer or smaller companies, will be worth far less, yet subject to infinitely greater responsibilities, than the new authorizations given wholesale by CAB to the non-skeds.

'Supplemental Carriers'

• **The CAB majority** (Chairman Rizley, Vice Chairman Adams, and Member Lee) no longer desire to call them non-skeds or large irregulars. Actually, under the new decision, neither term is accurate, since they can now schedule flights on a regular basis. The new name is "Supplemental Air Carriers."

Where those lines formerly held letters of registration as evidence of their operating authority, they will be issued new forms entitled "Supplemental Air Carrier Interim Operating Authorization."

Each holder of such an authorization will be permitted to advertise, schedule, sell and operate a maximum of 10 flights per month in each direction between each pair of points in the country, carrying individually-ticketed passengers. In addition, all carriers have been provided with unlimited authority for plane-load charters. Domestically, these privileges apply to cargo as well as passengers.

• **In the international field,** the unlimited charter right is extended for cargo only. Passenger charters in that field will be on an individual exemption basis as set out in CAB's Transatlantic Charter Policy last May.

The new authority is conveyed under a blanket industry-wide exemption order. When the Board finishes

ATC Officers Plan for 1956

Newly elected officers of Air Traffic Conference at San Francisco talk over plans for 1956. Left to right, Arthur F. Kelly, Western Air Lines, president; Rex Brack, Braniff International Airways, first vice-president, and John Clemson, Trans World Airlines, second vice president.

hearings, presently under way, on so-called individual fitness presentations, the decision will be made as to whether the enlarged authority for non-skeds will be continued under an exemption or through certificates.

There is evidence of legal doubt of CAB's ability, under the Act as now constituted, to issue any certificate with a limit on the amount of scheduled service. But there is pending in Congress new legislation designed to correct that "defect." Conceivably, the Board's decision on that controversial point has been avoided pending the outcome of such legislation.

Minority Dissent Strong

• **Two CAB Members,** Republicans Chan Gurney and Harmar D. Denny, objected violently to the decision. They said: "The decision abandons the basic principles of the Act and returns the regulation of air transportation to the law of the jungle."

To appreciate how it came about, one must go back to 1951. That year, CAB embarked on a policy of screening the good from the bad in the non-sked industry which then numbered upwards of 70 carriers. It required each carrier to apply for an individual exemption, a method designed also to replace a blanket exemption for the industry then in effect.

The weeding-out process started. Some 16 companies believed by CAB to be operating within the law were issued individual exemptions before the roof caved in. It seemed that in each individual exemption issued, there was a specific limit on the amount of service that could be provided. It permitted three flights a month between designated pairs of major cities and eight a month between any other pairs of points.

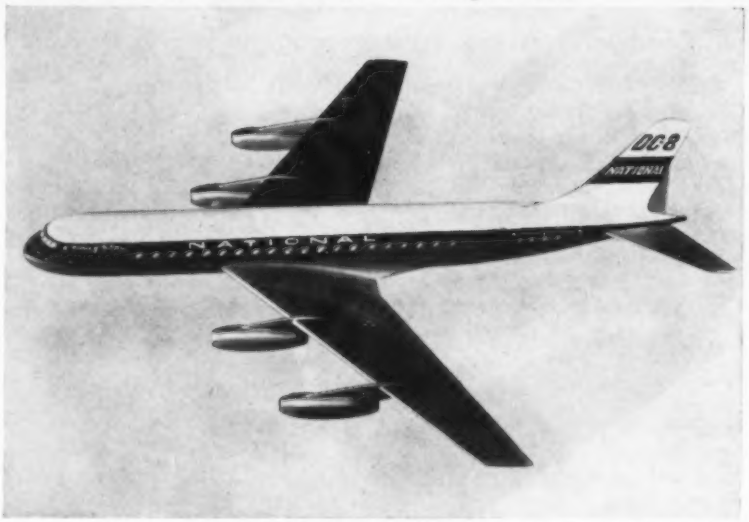
But since there was a long list of applicants to be dealt with on this individual basis, it occurred that the "approved" carriers were accepting limitations more stringent than those applicable to the carriers not yet considered, some of whom were flagrant violators.

• **To correct** this obviously unfair situation, CAB then proposed the same limitations for all non-skeds, pending completion of the individual screenings. It became known as the "3 and 8 regulation."

Some of the more robust non-skeds, terming the new rule a "death edict," received the support of Alabama Senator Sparkman's Small Business Committee which criticized CAB up one airlane and down another. Two other non-skeds went into court and got a judge to stay the regulation because it apparently meant putting carriers out of business without formal hearings.

The heat generated by Sparkman's committee convinced CAB that, rather than go to a higher court, it should give each carrier a hearing before trying to enforce a specific limitation on flights.

National to Get DC-8s in May 1959



Douglas DC-8 shown here in National Airlines' markings is due for delivery to NAL in May 1959. National has ordered six of the jets as part of a $95-million expansion program. Planned New York-to-Miami DC-8 schedule will be 2 hours-21 minutes.

• **Thus was instituted** the "Large Irregular Investigation" (Docket 5132). Against that background also was a 1951 decision in the "Transcontinental Coach-Type Service Case" in which the CAB denied various non-sked applications for coach certificates. There may be a supplemental non-certificated role for those carriers, said CAB, and that will be an issue in the investigation.

Some 60-odd non-skeds then filed for supplemental authority. CAB's program was to hear all parties, then arrive at a decision as to whether there is a supplemental role for the non-skeds and, if in the affirmative, define what that role is, and which of the applicants should be authorized to fill it.

Hearings Opened in '52

• **Hearings opened** in Washington in 1952. They moved to Miami to Los Angeles to Seattle, back to Washington, and only 30 of the applicants had been heard after two years. CAB then stepped in with a new procedure.

The policy question, it felt, was being too long delayed. Since there were two general parts to each applicant's presentation—public interest and fitness—CAB decided that the remaining 30 who had not been heard, could be heard on the relatively simple issue of public interest.

The agency felt it had heard enough on the fitness arguments of the original 30 to be able to form an industry-wide policy. This expedited the case considerably, and the hearings, consuming some 30,000 pages of oral transcript, were brought to hasty conclusion in mid-1954.

Two Examiners—Ralph L. Wiser and Richard A. Walsh—sat through the entire hearings. Their recommendation came out in March, 1955, generally against any kind of route-type operations involving sales of space to individual passengers. They favored the charter field as a supplemental area within which the non-skeds could operate.

• **On August 19, however,** the boat rocked again. CAB decided against its former course and ordered reopened hearings on the remaining 30 carriers who had been heard on the public interest issue but not on matters of fitness. These hearings resumed in October and are still in progress. Also, some of the original 30, who had been heard on both phases, were given permission to freshen up their fitness cases in the reopened hearings.

Significantly, whereas CAB Bureau Counsel vigorously participated in the previous hearings, its appearance in those started in October had been almost a token one. It was when this first became apparent that the word "whitewash" began to circulate.

Of those in the non-sked industry, no matter how few or how many, that so abused the public over the years, that cheated the Government out of transportation taxes, and that completely belittled and ignored CAB and the Act, the three-man CAB majority now says: "This has been of inestimable value and convenience to the traveling public."

◆ ◆ ◆

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OF GOLDEN FALCON DC-7Bs

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■ When Eastern Air Lines takes delivery of its next fleet of DC-7Bs this spring, every plane will be equipped with the latest Sperry Flight Control System together with Sperry Radio Beam Couplers. Thus another great airline will soon be providing extra benefits for everyone concerned — its passengers, its pilots and its operating management.

■ For passengers, the Sperry system means smoother, more comfortable flights. For pilots, the Sperry system provides more precise control under difficult instrument flying conditions. For operating management, the system means increased economies resulting from direct, on-the-course flying.

■ In addition to the Sperry Flight Control System and Radio Beam Coupler, Eastern's new Golden Falcons will also have the advantages of Sperry dual Integrated Instrument Systems, giving pilot and co-pilot a pictorial presentation of all flight data in a simple, compact form. Sperry Engine Analyzers, which in the past have reduced Eastern's ignition delays as much as 47%, will also contribute to the safe, efficient operation of the luxurious new fleet.

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Inefficiency Plagues European Airlines

Low employee productivity, internal dissension, government interference, revival of nationalism contribute to continental carriers' lack of progress.

By WAYNE W. PARRISH

Something seems to be radically amiss with European air transport. It's on a treadmill. It's moving, but the motion is deceptive. It isn't going anywhere very fast.

A report just issued reveals the startling fact that the productivity of the airline employee in the U.S. is *two and one-half times* that of the airline employee in Europe.

European airlines are less prepared today to penetrate the mass travel market than they were five years ago. They've been moving in reverse to the trend in the U.S. where fares have been going lower and schedule frequencies stepped up. In Europe the cry is for higher fares because costs are going up.

But costs are within the control of managements. And instead of operating their airlines for profit on a businesslike basis, and expanding into an ever-greater traffic market, European managements have continued to build up vast empires of personnel. Instead of concentrating on the job at hand within Europe they've devoted much time toward obtaining more and more long-haul national prestige routes abroad.

• **The cold facts** tell quite a story. Interestingly enough, the facts come from the European airlines' own organization. Six major carriers—Air France, British European, KLM, Sabena, Scandinavian Airlines System and Swissair—established the Air Research Bureau several years ago with headquarters in Brussels. Since then LAI and Lufthansa have joined up. A.R.B. is directed by a highly intelligent researcher and economist, a Swede, by the name of Bo Bjorkman.

The latest report is quite revealing. The productivity per employee is so far below that of the U.S. as to remove any comparative doubts about efficiency despite the big wage differential between Europe and U.S. which should, at least theoretically, give all of the advantages to the European lines.

But aircraft utilization is none too high, and frequency of service has actually decreased as the carriers have added bigger equipment. Fares are considerably higher than in the U.S. All of the basic comparisons are shown in the adjoining box.

• **What's the heart** of the trouble? There is more than one reason, but a very large reason is probably traceable to the upheavals in managements of most European airlines over the past five years.

Air transport got its start in Europe, many years before it got underway elsewhere. Europe developed pioneers and leaders who pushed their airlines into the top ranks. They understood air transportation. But almost all of the pioneers are gone, either through death or for having been shoved aside. The toll of experienced personnel in European aviation, mostly through involuntary exile, has been very heavy in the past ten years.

It can be said, in fact, that there is a management crisis in almost every airline in Europe. It's either inexperience or politics or internal feuding. One or the other are very apparent everywhere.

• **Another clue** can be found in government interference or government controls, although this isn't universal. In some instances the disease is acute. Wherever governments control airlines, muddling or lethargy will be found.

Another clue is the failure of European carriers to adopt modern salesmanship. Selling is either scoffed at or subordinated far down the management line. There is very little selling effort worth the name in Europe. Plenty of picture postcard posters, but not real merchandising of the product.

Still another clue is the revival of nationalism. Each carrier is apparently trying to erect the biggest and best physical headquarters. They are tremendous—and very costly—monuments. But they are millstones around the necks of managements when it comes to economizing in order to lower fares and thus broaden the travel base. One suspects that the criterion of success is the size of the payroll, not economy and efficiency.

And one might also mention the dead hand of socialism. All too many European airline employees consider themselves to be civil servants, not employees of a profit-making private enterprise. It's difficult if not impossible to attain real efficiency under welfare state attitudes. The vast hordes of technical and semi-skilled workers in airline bases are a staggering sight. The productivity record shows the results.

• **Managements in Europe,** apparently, haven't faced up to the simple economic laws of air transportation and how to penetrate the mass market. What they have achieved in building enormous empires is to open the way to the independents who are getting stronger and who offer the only hope, as of now, for making air transport available to the masses of people. Currently the European carriers are providing tourist or coach service for first class fares plus a surcharge.

American observers are often appalled at the casual manner of operating in Europe. Many stops are 45 minutes in length. Aircraft sit in select

How European Airlines Compare with Ours

Here is how the Air Research Bureau of Brussels compares vital operational factors as between major European and all U.S. scheduled airlines:

	1953	
	ARB members	U.S. domestic
Operating conditions:		
Average aircraft stage distance (kilometers)*	454	376
Passenger kilometers per station (million)	8.2	37.2
Average frequency of service (weekly)	4.6	30.0
Utilization:		
Average hours per day: Convair	5.7	6.3
Average hours per day: DC-6	7.5	9.0
Staff:		
Productivity thousand ton-kilometers	19.5	54.9
Average annual earnings per employee	$2,000	$4,700
Costs:		
Total cost per offered ton-kilometer (Convair)	$.36	$.231
Total cost per offered ton-kilometer (DC-6)	$.30	$.183
Revenue rates:		
Average passenger fare per kilometer (U.S.¢)	4.72	3.42
Average freight rate per ton-kilometer (U.S.¢)	34.4	15.7

* A kilometer is roughly six-tenths of a mile.

ramp positions for many hours at a time. It takes a day—if you happen to choose the right day—to travel over much of Europe.

One observer summed it up this way:

"They say there aren't more schedules because there isn't enough business to fill up more schedules. But there isn't enough business because the fares are too high. And fares can't be lowered because they don't have enough schedules because there isn't enough business. It's a carousel."

• **Some observers** are frankly concerned about the situation. Even one of the very best airlines is facing serious internal troubles. They've lost their competitive punch and there isn't any initiative to pull down the costs and start operating modern transportation within Europe.

There is less frequency of service in Europe today than there used to be, primarily because the airlines replaced smaller equipment with larger. The larger equipment produced a lower seat-mile cost, but frequencies suffered and the reduction of seat-mile cost was due solely to the greater efficiency of equipment and not to greater overall efficiency of the organization.

What will happen in the coming jet age is less than clear but an assumption can be made that the European carriers are really not prepared for it. Meantime the figures are discouraging to those who thought Europe would continue to pioneer the airline business and make it available and accessible to the average person. ◆ ◆ ◆

Airlines to Get 104-mph 'Copter Next Year

Operating costs of 12-passenger Sikorsky S-58 will be about half those of S-55; certification expected early in '56.

By ANTHONY VANDYK

Slated to enter commercial service in both the U.S. and Europe next year, the Sikorsky S-58 is the largest helicopter yet sold to an airline. New York Airways has ordered seven for delivery starting next spring while SABENA Belgian World Airlines plans to buy eight to be delivered from June onward.

Certification of the 12-seat helicopter by the Civil Aeronautics Administration should be completed early in 1956. The certification program should be facilitated by the large number of hours accumulated with the military (H-34) version of the S-58. Before the first commercial delivery is made, it is expected that military S-58s will have logged some 75,000 hours.

• **Although it bears** a strong resemblance to the smaller S-55, the S-58 is very different in performance. Its 1,525-hp Wright R1820 Cyclone gives the S-58 a cruise speed of more than 100 mph against the earlier model's 85 mph. Seating capacity is increased from five to 12 with the increase of lift power from 1,200 to 4,000 lbs.

The engine provides ample reserve power to meet schedules against strong headwinds and also enables mufflers to be used without inflicting a performance penalty. Most important of all to the airline operator, operating cost of the S-58 will be about half that of the S-55.

• **Sikorsky Aircraft** estimates that the total direct operational cost of the S-58 in commercial service will be $113.39 per hour. About 20% of this is for fuel. The S-58 for this costing purpose is estimated to consume 85 gallons per hour. Actual fuel consumption under cruising condition is 82 gallons per hour, but for an operation involving short-range flights of 15 to 20 miles, overall average consumption will be approximately 85 gallons per hour.

Thus fuel cost is 85 gallons per hour. At 27 cents per gallon that equals $22.90 per hour. Sikorsky Aircraft estimates conservatively that oil and aircraft lubricants will cost one-tenth of the fuel, or $2.29 per hour.

Maintenance and service costs for the airframe are based on the indication from initial service experience that some seven man-hours per flying hour are required. Salaries of an average mechanic and helper salary average $2.10 per hour. Seven hours at $2.10 per hour equals $14.70 per flying hour. Engine maintenance and service costs are estimated at $6.50 per hour. That includes replacement parts such as spark plugs, and the cost of major overhauls. Thus total cost for S-58's maintenance and service is $21.20 per hour.

The cost of minor parts likely to be required during line maintenance and during overhaul are estimated at $5.50 per hour. This would include such parts as gaskets, bushings, oil seals and detail parts of the major components that are likely to be replaced during subsequent overhauls such as clutch shoes, gears and bearings.

Outside repairs and replacement parts costs to standard aircraft equipment such as instruments, electrical and radio, are estimated at $3.00 per hour. (Replacement parts for the engine are already figured above with the overhaul cost, and the cost of replacement of major components, such as rotor blades and gear boxes, is figured under aircraft depreciation.)

• **Sikorsky Aircraft** says that past experience indicates the S-58 can be depreciated over five years, flying 2,000 hours per year, to a 20% residual value. (Some of the S-51s delivered in 1951 and now having over 8,000 hours flight time are still in daily service). Hence the figure of $20 per hour for aircraft depreciation is reached by taking the first cost of $250,000 less 20% residual value and dividing it by five years at 2,000 hours per year.

Spare aircraft components utilized as replacement parts and for rotational

Technical Features of S-58

Designed with ease of maintenance in mind, the S-58 has been provided with simplified access to all components. Only three hours are needed to effect a change of either engine or rotor head and main transmission. The clutch is easily serviced through a large door in the forward firewall.

The main transmission is accessible by means of quickly removable panels that open to provide platforms for convenient service. Other panels give complete access to servo units, flight controls and the accessory section of the main transmission.

The four fully-articulated all-metal blades of the main rotor are completely interchangeable. The four-bladed tail rotor is of new all-metal design with free-flapping mounting.

The main transmission has 25% fewer parts than previous Sikorsky units. It provides accessory drives for a generator and its blower, for the hoist and the primary servo-control hydraulic pumps, and for the rotor tachometer. This permits operation of these components in autorotation flight.

A hydraulic clutch permits running the engine disengaged at any speed without overheating. Intermediate and tail gear boxes are of the same design as used on previous Sikorsky helicopter models.

Space for baggage and radio equipment is provided forward in the cabin. Structural provisions for a 4,000-lb. automatic ground-contact cargo sling, plus a 600-lb. power-operated utility hoist, are included as standard equipment. Fuel is carried in nylon neoprene-impregnated cells beneath the main cabin.

Dual flight controls are provided. There are two independent hydraulic servo systems operating on both azimuth and collective pitch control. The electrical system is 24-volt direct current. A 200-ampere generator is installed as standard equipment.

maintenance might include the following over the life of an S-58, Sikorsky Aircraft says: one main rotor head; two tail rotor heads; three sets of main rotor blades; four sets of tail rotor blades; two clutch assemblies; one main transmission; one intermediate gear box; one tail rotor gear box; one set of hydraulic system components; instruments and electronics, and one engine.

On the S-55 the above items in quantities listed were approximately 70% of the initial cost of the aircraft and the same percentage is used for the S-58 for this estimate. These would be depreciated the same as the aircraft and would therefore be 70% of the $20 per hour computed above or $14 per hour.

• **In estimating pilot costs** it is assumed that each pilot flies about 800 hours per year. Thus, by dividing 800 hours per year into $8,000, the figure of $10 per hour is reached.

Based on the current rates available, an approximate rate of 10% per year is suggested for hull insurance coverage. This figure may vary depending on the operator, type of service and number of aircraft in operation.

In some cases S-55s have been included by airlines in fleet rates covering other aircraft. Thus the hull coverage figure of $12.50 per hour is reached by taking 10% of $250,000, the price of the S-58, and dividing it by 2,000 hours per year. To this figure of $12.50 must be added $2.00 per hour for passenger and public liability and property damage, making the total insurance cost $14.50 per hour.

• **The S-58's total** direct operational cost of $113.39 per hour is therefore reached by adding the items detailed above: fuel and oil, $25.19; maintenance and service, $21.20; replacement parts, $8.50; aircraft depreciation, $20; spare major components depreciation, $14; pilot costs, $10; insurance, $14.50.

For 15-mile blocks, cruising at 90 knots, a block speed of 73 knots or 84 mph is possible. Hence, cost per seat-mile is $1.35 per mile ($113.39 per hour divided by 84 mph). Net payload that can be carried with fuel for 150 miles including reserve, plus an allowance of 350 lbs. above the basic weight empty for passenger seats, cabin interior furnishings and radio is 3,450 lbs. or 1.725 tons. Hence cost per ton-mile would be 78 cents ($1.35 per mile divided by 1.725 tons).

Sikorsky has compiled some interesting data on spare part stocking. For a scheduled commercial helicopter operator having three to five aircraft, the manufacturer thinks that it might be advisable to have the following major components on hand to achieve maximum helicopter utilization through rotational maintenance: one main rotor head; two clutch assemblies; one set of main rotor blades; one tail rotor; one main transmission; one tail trans

Performance and Specifications of S-58 Helicopter

Performance

High speed at sea level	115 knots (132 mph)
Cruising speed	90 knots (104 mph)
Maximum rate of climb at sea level (normal rated power)	1,100 fpm
Vertical rate of climb at sea level (take-off power)	450 fpm
Hovering ceiling with ground effect (take-off power)	7,000 feet
Hovering ceiling without ground effect (take-off power)	2,500 feet
Fuel consumption (Cruising)	82 gal./hr.
Range (with normal fuel plus reserve)	235 Naut. mi.*(270 stat. mi.*)

Weights

Gross weight	12,600 lbs.
Useful load	5,070 lbs.
Weight empty, with standard equipment	7,530 lbs.

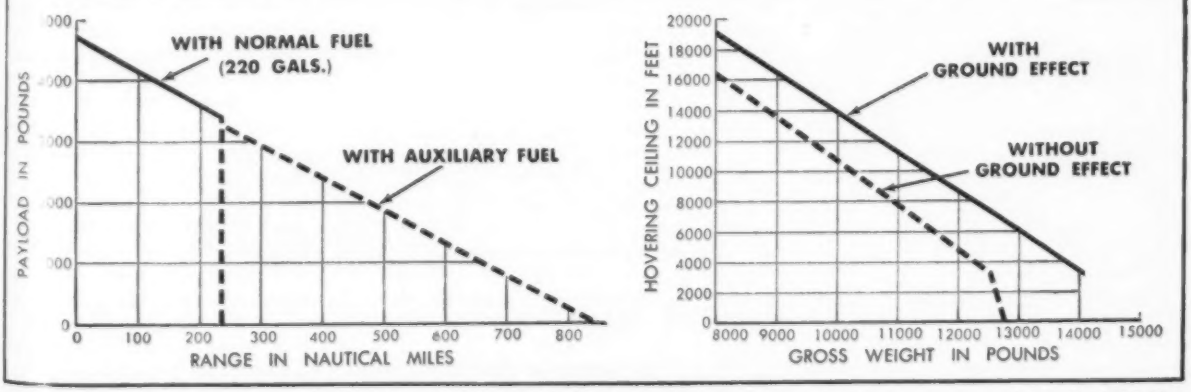
Specifications

Seating capacity: Crew (pilot and co-pilot)
Passengers—12, or 8 litters
Engine: Wright Cyclone C9 (same as Military R-1820-84)
Ratings—Take-Off: 1,525 BHP at 2,800 RPM at 1,900 feet altitude
Normal: 1,275 BHP at 2,500 RPM at 3,500 feet altitude

DIMENSIONS

Fuselage length	47′ 2″
Stowage length (tail pylon folded)	37′ 0″
Fuselage width	5′ 8″
Height over-all	14′ 2″
Main rotor diameter (blade tip circle)	56′ 0″
Tail rotor diameter (blade tip circle)	9′ 4″
Main landing gear tread	12′ 0″
Passenger cabin length	13′ 3″
Passenger cabin width	5′ 3″
Passenger cabin depth	6′ 0″
Fuel capacity	220 gals.

* Maximum ferry range with auxiliary fuel is in excess of 850 nautical miles (972 statute miles).



PAYLOAD VS. RANGE data for the S-58 cruising at 90 knots with 15 minutes reserve fuel are based on a gross weight of 12,600 lbs.: empty weight, 7,530 lbs.; oil, 75 lbs.; pilot, 170 lbs.; reserve fuel, 130 lbs.; fuel and payload, 4,695 lbs. Hovering ceiling versus gross weight data for the S-58 in chart at right are in NACA standard air with takeoff power.

NEW YORK AIRWAYS is the first commercial operator to order the S-58. It is due to get the first of eight on order in the spring and to start operations on June 15.

mission; one intermediate transmission.

• **Based on current prices,** an outside conservative estimate of 25% of the cost of one S-58 aircraft could be used for these assemblies. For an operator with five to eight aircraft, a second main rotor head might be advisable, raising the above figure to 30% of one aircraft. It would also be advisable to have on hand a spare Wright R-1820-84 engine.

Requirements for the smaller spare parts and wear items may be estimated as follows (the percentages given apply to the combined aircraft value and should be representative for three or more aircraft): initial allowance, 3%; 0 to 600 hours average per aircraft, 2%; 600 to 1,200 hours average per aircraft, 3%; 1,200 to 1,800 hours average per aircraft, 4%; each 600 hours average per aircraft thereafter, 5%.

It may be noted that the above allowances for the major components, and for the smaller parts and wear items, total to the same lifetime average spare part cost of 0.008% of the aircraft original value per hour, as used in the cost of operation estimates. ◆◆◆

Congressional Pressures Menace Independent Agencies, Says Rizley

CAB Chairman Ross Rizley said last month that the integrity of the Government's independent agency system is jeopardized when Congressional interest in judicial proceedings passes normal limits.

"I think it wholly within the bounds of propriety," he said, "for any congressman to inquire of an agency as to the progress his constituent's case is making, and to assure himself that the case has not become mired down in red tape."

"However," he added, "when Congressional interest passes this point, in my opinion it becomes something that jeopardizes the integrity of the whole independent agency system."

• **In his first major** policy address since joining CAB eight months ago, Rizley spoke before the Enid (Okla.) Chamber of Commerce on Nov. 18. He criticized pressures brought to bear against the Board and said there had been "an undue shift of emphasis from public convenience and necessity to the seeking and protection of private carrier rights."

Contending large carriers get the breaks under the present procedural setup, the Chairman said: "The true issue of public convenience and necessity—that is, whether the public needs more service or more competitive service between any two points—is submerged in the question of who shall render a service which everyone agrees is necessary."

The courts are also to blame for their interpretations of the so-called Ashbacker doctrine, he said. "By emphasizing the private rights of carriers in connection with applications for new routes or new services . . . they have not left the Board free to decide whether communities need additional service unless it also before final award gives comparative consideration to all applicants who desire to perform the service.

"The effect of this doctrine over the long run," he continued, "is to give an advantage to the large carriers, since they are far better able to support the costs of a drawn-out and complicated proceeding. Legal fees and payments to high-priced economists mount very rapidly."

A former Oklahoma Congressman himself, Rizley suggested that Congress give this situation "a pretty thorough review to see whether the Act cannot be revised to cure some of these difficulties."

"Certainly the doctrine of the Ashbacker case can be given a more restricted application," he said. "And there may well be certain issues in new route cases—like fitness, willingness, and ability—which can be handled in *ex parte* proceedings without destroying the basic foundation of a hearing on public convenience and necessity. Rules of evidence can also be tightened."

Rizley also suggested creation of an Advisory Assembly on Civil Aviation, called for "closer collaboration" by the Government with the industry in bilateral negotiations, and again endorsed the Board's proposed new policy of permitting staff members to make certain business trips on the airlines free or at reduced rates.

MATS Officer Tells of Contract Headaches

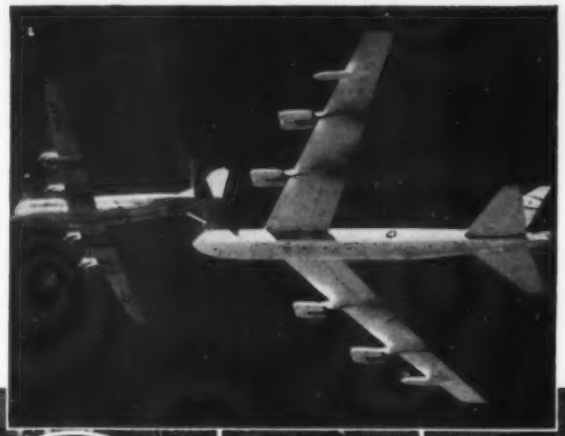
The "worst" problem facing contract maintenance is annual funding, Col. Merle Brown of Military Air Transport Service's aircraft maintenance division told the NATA convention in Phoenix, Ariz. last month. (See story, page 76.) The necessity for calling bids for each contract each year results in "a crazy game of musical chairs," with all or most contractors getting new contracts but usually for different types of airplanes.

The annual planning also results in the slowness of aircraft being fed into bases at the beginning of the year, followed by a jam-up at the end of the period. However, he revealed, MATS, Air Materiel Command and the contractors are taking tentative steps to correct the deficiencies in the basic law.

On the civilian contractors side of the problem, Brown found insidious "the vicious practice of underbidding" and called for equalizing.

He told the group that MATS and the Air Training Command, are the largest users of contract maintenance. MATS prefers the system, he observed, because Air Force depots of necessity give priority to tactical aircraft. Planning calls for eventually phasing all transport type aircraft out of the depots. The present MATS program costs about $4 or $5 million a year.

Timetable for contracting transport types was cited as follows: DC-6 and C-54 types are already being contracted. Portion of C-97 maintenance should be contracted in fiscal 1957. Constellations will be contracted but to a single contractor and not before fiscal 1957. The C-124 will not be contracted before 1958.



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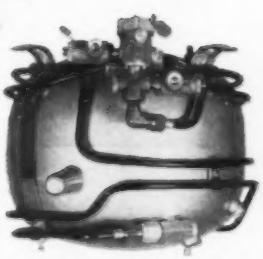

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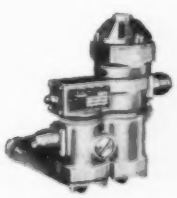

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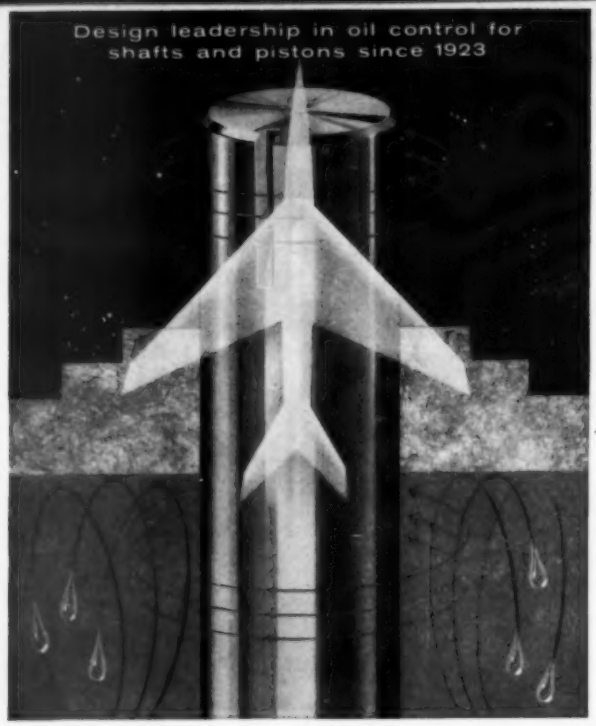

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Aerotherm Corporation, The 17
Air France 53
Airborne Accessories Corporation 67
AiResearch Manufacturing Company,
Division of The Garrett Corporation 45
Allied Maintenance Corporation 13
Aro Equipment Corporation, The 89
Avro Aircraft Limited 78

B & H Instrument Company, Inc. 64
Barber-Colman Company 95
Bendix Aviation Corporation
Eclipse-Pioneer Division 35
Braniff International Airways, Inc. 66
Bulletin Board (Classified) 92, 93
Burns Aero Seat Company 71

Chance Vought Aircraft, Inc. 65
Chandler-Evans, Div.-Niles-Bement-Pond Company 8, 9
CONVAIR—A Division of General Dynamics Corporation 19, 40
CONVAIR—A Division of General Dynamics Corporation
(Fort Worth) 58
Curtiss-Wright Corporation 91

Douglas Aircraft Company 60, 61

Eclipse-Pioneer Division, Bendix Aviation Corporation 35
Elastic Stop Nut Corporation 2

Fairchild Engine & Airplane Corporation,
Stratos Division 77
Federal Aircraft Works 43
Flightex Fabrics, Inc. 52

General Electric Company 72, 73
G. M. Giannini & Company, Inc.
Airborne Instrument Division 12
B. F. Goodrich Company, The 22
Greer Hydraulics, Inc. 63
Gyromechanisms, Inc. 71

Hollywood Roosevelt Hotel 70
Hydro-Aire, Inc. 14

Indiana Gear Works, Inc. 41

Kaiser Aluminum & Chemical Corporation 55
Kelite Corporation 47
Kollsman Instrument Corporation,
Sub.-Standard Coil Products Company, Inc. 10

Hotel Lexington 54
Lockheed Aircraft Corporation 42, 62
Lund Aviation, Inc. 54

Marman Products Company, Inc. 87
McDonnell Aircraft Corporation 29
Menasco Manufacturing Company 68
Minneapolis-Honeywell Regulator Company,
Aeronautical Division 1

D. Napier & Son, Ltd. 56
North American Aviation, Inc. 46

Peirce Wire Recorder Corporation 44
Phillips Petroleum Company 96
Pioneer Parachute Company, Inc. 74
Purolator Products, Inc. 36

Radio Corporation of America 48, 49
Resistoflex Corporation 38
Rolls-Royce, Limited 3

Scott Aviation Corporation 70
Scovill Manufacturing Company 57
Sikorsky Aircraft Division of United Aircraft Corp. 20, 21
Simplex Piston Ring Manufacturing Company 90
Sperry Gyroscope Company,
Division of The Sperry Rand Corporation 82
Stratos Division, Fairchild Engine & Airplane Corp. 77

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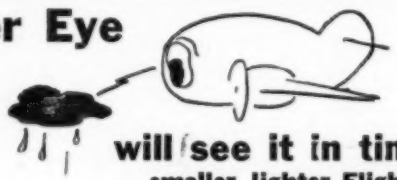

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CAB NEWS

Pending Cases

Now that first three big route cases have been decided, next in line for early Board decision are the **North-South Air Freight Case** and **Eastern-Colonial Merger Case.**

The freight case involves choice of a successor(s) for the original certificate of U.S. Airlines, Inc., which is now bankrupt. Leading candidates are Riddle Airlines and American Air Export & Import Co.

While CAB decision is likely in December in EAL-Colonial Case, it involves White House action because of CAI's Bermuda route and, thus, approximate issue date cannot be pinned down.

Reconsideration actions by CAB will highlight December. **The Denver Service Case, Southwest-Northeast Case,** and **Large Irregular Investigation**, all will be up for another look around Christmas. Although CAB could put off decisions until after New Year's, the split vote in original rulings might then be reversed by Membership changes on Jan. 1, and the present majority wants reconsideration votes before them by present Members.

Applications & Petitions

Pan American World Airways asked early approval of its proposed New York-Nassau service promising Douglas DC-7B service over the route on 3½ hour schedules.

National Airlines termed purchase price in Eastern-Colonial Merger Case to be "exorbitant and outrageous" and urged disapproval of the merger agreement.

Bonanza Air Lines has asked CAB to reconsider and reverse decision in Southwest Renewal Case calling for reinstatement of United Air Lines at Santa Barbara, Eureka, and Monterey

Recent CAB Decisions

Aerovias Sud Americana, certificated all-cargo line, granted one-year exemption to provide irregular cargo service to Managua, San Jose (C.R.), Quito, and Guayaquil.

Resort Airlines turned down on request for expansion of its certificate renewal case to include applications for new authority in the U.S. and Canada.

Flying Tiger Line denied immediate temporary authority to carry air express, pending outcome of same issue in Air Freight Renewal Case.

CAB Calendar

Dec. 5—Hearing, Foreign Air Carrier Charter Service Investigation Wash., D. C. Docket 7173.

Dec. 6—Hearing, Florida-Texas Service Case (National Airlines et al.) Wash D. C. Docket 5701 et al.

Dec. 13—Hearing, Pittsburgh-Cleveland-Detroit Restriction Case (Northwest Airlines et al.) Wash., D. C. Docket 4294.

Dec. 16—Hearing, Cincinnati-Detroit Route Transfer Case (TWA et al.). Wash,. D. C. Docket 7278.

Jan. 10—Hearing, Tucson, Ariz. Service Case (TWA). Tentative. Docket 5564.

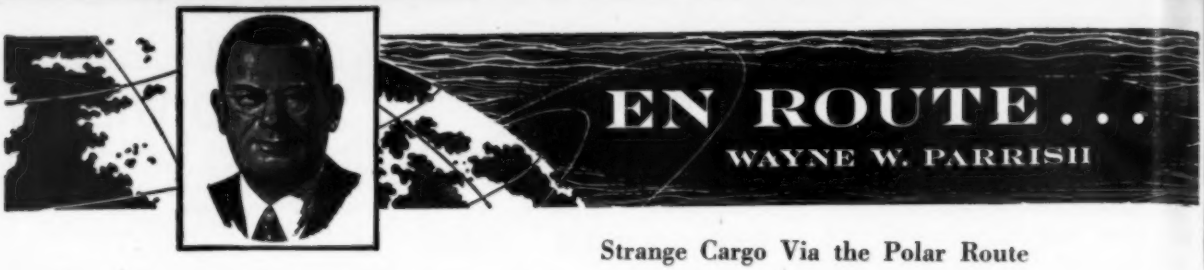
Jan. 23—Hearing, Resort Airlines Renewal Case. Tentative. Docket 6545.

Feb. 20—Hearing, International Air Freight Forwarder Investigation. Wash., D. C. Docket 7132.

Summary of U.S. International Airline Traffic for Third Quarter, 1955.

(Compiled by American Aviation Publications from Official CAB Data)

AIRLINES	REVENUE PASSENGERS (IN THOUSANDS) 1955	1954	% Change	REVENUE PASSENGER MILES (IN MILLIONS) 1955	1954	% Change	AVAILABLE SEAT MILES (IN MILLIONS) 1955	1954	% Change	PASSENGER LOAD FACTOR 1955	1954	FREIGHT TON MILES (IN THOUSANDS) 1955	1954	% Change	TOTAL TON-MILES REV. TRAFFIC (IN MILLIONS) 1955	1954	% Change	AVAILABLE TON-MILES FLOWN (IN MILLIONS) 1955	1954	% Change	% AVAILABLE TON-MILES USED 1955	1954
American	35.3	21.7	62.7	25.7	14.6	76.0	33.8	23.4	44.4	76.0	62.39	606	358	69.3	3.3	1.9	73.7	4.5	3.1	45.2	73.45	61.29
Braniff	9.6	9.3	3.2	20.6	21.9	-5.9	45.3	43.2	4.9	45.5	50.69	205	282	-27.3	2.5	2.9	-13.8	5.7	5.6	1.8	44.03	51.79
Colonial	9.6	12.9	-25.6	7.4	10.0	-26.0	11.2	11.9	-5.9	66.1	84.03	11	12	-8.3	0.8	1.1	-27.3	1.1	1.8	-38.9	70.29	61.11
Delta	13.2	12.1	9.1	15.3	13.5	13.3	29.7	32.1	-7.5	51.5	42.06	152	266	-42.9	1.7	1.7	. . .	4.1	4.4	-6.8	42.17	38.64
Eastern	49.2	47.8	2.9	69.4	69.4	. . .	95.3	120.4	-20.9	72.8	57.64	212	410	-48.3	7.7	8.0	-3.8	12.2	14.0	-13.6	63.62	57.14
National	28.1	26.0	8.1	24.0	13.6	2.9	26.1	25.8	1.2	53.6	52.71	130	119	9.2	1.6	1.5	6.7	3.2	3.2	. . .	49.42	46.88
Northwest	30.1	27.4	9.9	62.7	51.1	22.7	98.7	81.6	21.0	63.8	62.62	1,753	1,739	0.8	10.8	8.1	33.3	15.8	12.1	30.6	68.60	66.94
Pioneer	34.5	34.5	. . .	41.5	37.7	10.1	70.8	64.2	10.3	58.6	58.72	691	719	-3.9	5.2	5.0	4.0	9.6	8.8	9.1	54.71	56.82
Pan American																						
Latin Amer.	286.4	244.9	16.9	277.4	238.4	16.4	401.4	370.6	8.3	69.1	64.33	7,647	7,670	-0.3	34.9	31.4	11.1	54.5	49.0	11.2	64.06	64.08
Atlantic	286.8	152.5	88.1	370.8	290.4	27.7	535.7	432.6	23.8	78.6	67.13	4,974	3,606	37.9	45.8	35.9	27.6	67.8	56.0	21.1	67.56	64.11
Pacific	66.5	31.3	112.5	199.8	158.0	26.5	266.8	227.9	17.1	74.9	69.33	2,933	2,557	14.7	26.8	22.3	20.2	37.7	34.1	10.6	71.21	65.40
Alaska	27.0	26.5	1.9	33.0	29.5	11.9	48.6	46.1	5.4	67.9	63.99	1,117	1,144	-2.4	4.5	4.3	4.7	8.0	7.6	5.3	56.22	56.58
TWA	83.6	73.0	14.5	220.8	202.0	9.3	301.1	284.2	5.9	73.3	71.08	2,005	2,124	-5.6	27.1	24.9	8.8	37.0	33.8	9.5	73.30	73.67
United	30.5	22.3	36.8	75.7	55.3	36.88	87.3	67.1	30.1	86.7	82.41	158	143	10.5	8.2	5.8	41.4	10.6	7.1	49.3	76.97	81.69
TOTALS	990.3	742.2	33.4	1,484.1	1,205.4	23.1	2,051.8	1,831.1	12.1	72.3	65.83	22,594	21,149	6.8	108.9	154.8	16.9	271.7	240.6	12.9	66.62	64.34



Strange Cargo Via the Polar Route

This sure is a cockeyed world.

It was noon on a fine warm September day in Paris. I dropped by the Scandinavian Airlines ticket office on the tree-lined Boulevard des Capucines to pick up my friend Pierre Grocq for lunch. We walked down the boulevard toward the Opera and on to the Place Gaillon, one of the countless tiny squares hidden away in the French capital.

We entered the Restaurant Pierre, found a good table along a window, ordered an excellent meal and some fine wine, and talked shop. Since my friend Pierre is cargo manager for SAS, the conversation inevitably got around to how is business.

You could have knocked me over with a corset stay when I learned what my friend Pierre has been up to.

He's been shipping grosses of *soutien-gorge* by air over the polar route to Los Angeles. Now that's a shocker, isn't it?

You mean to tell me you don't know what is a *soutien-gorge*? Well, I didn't either, but being the good Frenchman that he is, Pierre explained all.

Soutien-gorge, it turns out, is the French word for what we call brassiere. *Soutien* means support, or prop. *Gorge* means throat, but it also means bosom, neck and shoulders. Get it?

But, says I, I thought brassiere is a French word, so how come? It *is* a French word, it seems, but in French, brassiere means an infant's bodice. And in the plural it means shoulder straps for a knapsack. You gals can figure that one out, but you'd better make sure what you're wearing.

Now that we've got the definition all worked out, says I, what in the world are you doing shipping grosses of bras to California? You mean to tell me that there aren't enough bra manufacturers in the U.S. to supply the Hollywood market? You mean you can ship that stuff a quarter of the way around the world by air—via Greenland, of all things—and do this profitably?

Perishable Item

Well, that's the way it is. Seems that the "Made in France" label is magic out in Hollywood. The gals are buying 'em like hot-cakes. Pierre can put a 50-kilo box (250 bras) on an airplane in Paris at noon bound for Copenhagen. The shipment is transferred to the polar flight to California and arrives there next afternoon. First time I realized that a bra was so perishable that it has to be rushed by air but stranger things than that happen in Hollywood.

So I says to my friend Pierre, what in the world has this French *soutien-gorge* got that an American bra doesn't have. Ah, well, says Pierre, with a knowing Gallic smile, this article has a new kind of fastener in the back. Much easier and faster to take off. More flexible in the front.

So I gulped down some more wine and concluded that if SAS can be flying bras from France to California via Denmark and the Greenland ice cap, air transportation is surely just in its infancy.

Scotch in England: Phooey!

Let's now turn to the subject of whiskey. Scotch whiskey in particular. Next time I go to Europe I'm going to take as much Scotch as the customs people in other countries will permit. I'm fed up to the teeth with the lousy Scotch whiskey served in England and over the entire Continent.

I find that a lot of Americans don't realize that there's a big difference in Scotch. But there is. The British ship to the U.S. the best Scotch with a proof of 86.8. It is a clear and dry whiskey.

The worst Scotch of all is served in England itself. Not only do they have that ridiculous business of "singles" and "doubles," but the stuff is 60 proof and it has a sweet taste. It may give you a temporary lift but it's very transitory and you end up feeling blah blah and crying for a bubbly 7 Up or a glass of milk.

So far as I have been able to determine, the British export the same lousy stuff to the Continent and even to the colonies and much of the Commonwealth. But I'm puzzled about the whole thing. In France each bottle of Scotch has to be labeled and the label for the best stuff reads "Alcoholic Strength 43.4 Gay Lussac." I have been told that this is a French formula meaning the same strength as the stuff exported to the U.S., but I can't believe it. If it is, then the quality is lower, because it has the same taste and effect as the stuff in England.

We operate in the reverse with our bourbon. Many Americans find great price bargains for American bourbon at Bermuda, Nassau, Mexico and other places. But it is low-proof export bourbon. No kick. I have been told that if an American buys some of this stuff abroad, returns home and is disappointed, the distillery will replace each bottle with the domestic high-proof bourbon—no questions asked.

Maybe somebody can give me the lowdown on the Scotch situation. Why is it that only the U.S. gets decent Scotch? What is meant by the French label "43.4 Gay Lussac?" Why isn't the best Scotch exported to the Continent if the Scottish distillers haven't enough to supply the world? What makes for a good Scotch and why is that lousy stuff abroad so lousy?

It's bad enough that you can't get enough ice for a Scotch and soda in Europe without having to cart your own stuff all the way back across the Atlantic.

One for 33

As many times as I've been in Amsterdam, I saw a brand new sight on the August trip. Henrik Scholte, secretary for special services to the general operations group of KLM, and one of the best airline public relations men I've known, took me and a few others on a night tour through one of the oldest parts of canal-lined Amsterdam.

For block after block and then some, every old house is occupied by prostitutes. Henrik swears there are 24,000 licensed women in Amsterdam and I can believe it. For a city of 800,000, this means one for every 33 permanent inhabitants, but of course the heavy population of prostitutes is due to Amsterdam being a big port. In all Europe I have never seen such a concentration. How they can all make a minimum living is beyond me, but there they were, all races, colors and nationalities, packed in a big area just a block or so east of the main business section of the city.

The latest count in Paris, I was told, is 40,000 prostitutes, or one for every 1,000 inhabitants. Americans make a big to-do over the presence of such open mass prostitution in Europe, but actually it is largely a tragic result of two big wars plus the refusal of European business and industry to emancipate women by paying decent wages and salaries.

Do It Yourself

On a fine warm August evening in Paris, two of us took a cab to the top of Montmartre and found a tiny open-air restaurant. Nobody in the place spoke English so my friend, who knew a little French, went into a complicated explanation to the waitress of how to make two nice dry martinis with a four-to-one ratio. I kept my doubts to myself that the message got through.

A little time elapsed and then I spied the waitress lugging a huge tray to our table. On it were eight jiggers of gin, two jiggers of vermouth, two big mixing glasses, one pitcher of ice, and two empty glasses for the final product. It was a staggering sight, believe me. But wonder of wonders, the end result of the mixing at the table was about as good as they come. The moral is never let the language barrier get in the way of a good martini.

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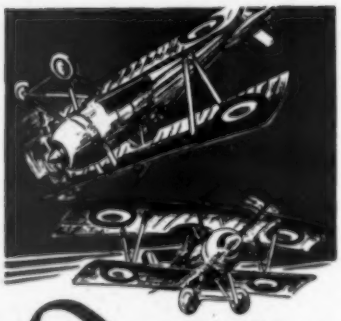
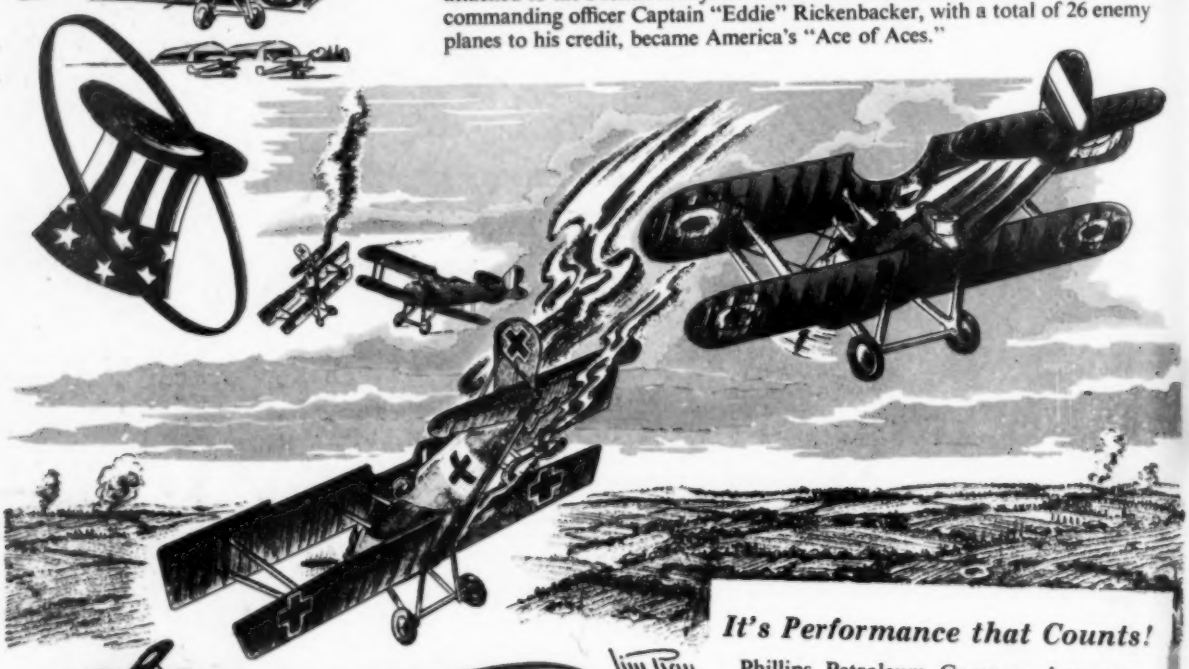


Squadron of Aces

In World War I, the famous "Hat in the Ring" 94th Pursuit Squadron, U. S. Air Service, chalked up many milestones in American military aviation.

Its members flew the first U. S. patrol over enemy lines in March of 1918. From April 14, 1918, through November 11, 1918, pilots of the 94th Pursuit Squadron scored 66½ victories over enemy aircraft. This figure does not include Major Raoul Lufbery's 17 victories, which were all scored while he was attached to the French Army. Personnel of the 94th included six "Aces," and commanding officer Captain "Eddie" Rickenbacker, with a total of 26 enemy planes to his credit, became America's "Ace of Aces."



"ACES" of the
"HAT IN THE RING" 94th PURSUIT SQUADRON

Captain Edward V. Rickenbacker	26 victories
Captain Reed Chambers	7 victories
Captain Douglas Campbell	6 victories
1st Lieutenant Harvey W. Cook	7 victories
Captain Hamilton Coolidge (killed in action)	8 victories
Major Raoul Lufbery* (killed in action)	17 victories

*Major Lufbery, first commanding officer of the 94th, was the first pilot wearing the American uniform to shoot down an enemy plane (April 12, 1918), but never received official confirmation of this victory. He was killed in action on May 19, 1918, while in command of the 94th.

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